



# Appendix C - Visual Resources Study Report

Bad Creek Pumped Storage Project

*Oconee County, South Carolina*

January 2025



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# 1 Project Introduction and Background

Duke Energy Carolinas, LLC (Duke Energy or Licensee) is the owner and operator of the 1,400-megawatt Bad Creek Pumped Storage Project (Project) (FERC Project No. 2740) located in Oconee County, South Carolina, approximately eight miles north of Salem. The Project utilizes the Bad Creek Reservoir as the upper reservoir and Lake Jocassee, which is licensed as part of the Keowee-Toxaway Hydroelectric Project (FERC Project No. 2503), as the lower reservoir.

The existing (original) license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) for a 50-year term, with an effective date of August 1, 1977, and expiration date of July 31, 2027. The license has been subsequently and substantively amended, with the most recent amendment on August 6, 2018, for authorization to upgrade and rehabilitate the four pump-turbines in the powerhouse and increase the Authorized Installed and Maximum Hydraulic capacities for the Project.<sup>1</sup> Duke Energy is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process, as described at 18 Code of Federal Regulations (CFR) Part 5.

In accordance with 18 CFR §5.11 of the Commission's regulations, Duke Energy developed a Revised Study Plan (RSP) for the Project and proposed six studies for Project relicensing. The RSP was filed with the Commission and made available to stakeholders on December 5, 2022. FERC issued the Study Plan Determination on January 4, 2023, which included modifications to one of the six proposed studies. Duke Energy completed its first year of studies in 2023 with stakeholder consultation as required by the Commission's SPD. Duke Energy filed the Initial Study Report (ISR) on January 4, 2023, and per the Commission's regulations at 18 CFR §5.15(c), Duke Energy held an ISR meeting with participants and FERC staff within 15 days of filing the ISR on Wednesday, January 17, 2024. Duke Energy completed its second and final year of studies in 2024; this Updated Study Report [18 CFR §5.15(c)] describes the Licensee's methods and results of the studies conducted in support of preparing an application for a new license for the existing Project and construction of the proposed Bad Creek II Power Complex (Bad Creek II).

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<sup>1</sup> *Duke Energy Carolinas LLC, 164 FERC ¶ 62,066 (2018)*

## 2 Visual Resources Study

### 2.1 FERC Environmental Resource Issues

The Commission issued Scoping Document 2 on August 5, 2022, which identified the following environmental resource issues to be analyzed in the National Environmental Policy Act (NEPA) document for the Project relicensing related to scenery and visual resources. The resource issue addresses the effects of continued Project operations as well as potential construction and operation of a second powerhouse during the new license term:

- Effects of Project construction, operation (including the presence of Project facilities), and maintenance activities on scenery and visual resources.

The Visual Resources Study is complete, and this report presents methods and results of individual study tasks.

### 2.2 Study Goals and Objectives

Tasks carried out for the Bad Creek Visual Resources Study employ standard methodologies that are consistent with the scope and level of effort described in the RSP. The main goals of the Visual Resources Study were to assess baseline conditions and provide an evaluation of potential visual impacts from construction and operation of Bad Creek II through the following objectives:

- Describe the key scenic characteristics of the existing landscape within the Project area and surrounding lands expected to potentially be within visual range of Project facilities.
- Identify areas within the existing landscape from which the existing and proposed Bad Creek facilities are or would potentially be visible.
- Identify existing project operations and maintenance activities that affect visual characteristics.
- Evaluate expected impacts of construction and operation of the Bad Creek II Complex on visual resources and any proposed protection, mitigation, and enhancement measures.

Nine study tasks were proposed in the RSP for the Visual Resources Study to meet study objectives as listed below:

- Task 1 – Existing Landscape Description
- Task 2 – Seen Area Analysis
- Task 3 – Field Investigation



- Task 4 – Key Views Selection
- Task 5 – Existing Visual quality Assessment
- Task 6 – Visual Analysis
- Task 7 – Visual Management Consistency Review
- Task 8 – Mitigation Assessment
- Task 9 – Conceptual Design of Bad Creek II Complex

### 3 Report Layout

All tasks for the Aquatic Resources Study are complete and this final report has been developed in consultation with the Recreational and Visual Resources Resource Committee; the report is presented in Appendix D. Documentation of consultation with the Recreational and Visual Resources Committee is also included.

**Table 1. Recreational Resources Study Report Attachments**

| Study Report Title                         | Appendix | Attachment Title              |
|--|----------|-------------------------------|
| Appendix C – Visual Resources Study Report | 1        | Consultation Documentation    |
|  | 2        | Potential Key Views Photo Log |
|  | 3        | Annotated Visualizations      |

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# **VISUAL RESOURCES STUDY FINAL REPORT**

**Bad Creek Pumped Storage Project  
FERC Project No. 2740**

*June 26, 2024*

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**VISUAL RESOURCES STUDY FINAL REPORT**  
**BAD CREEK PUMPED STORAGE PROJECT**  
**FERC PROJECT NO. 2740**

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## ACRONYMS AND ABBREVIATIONS

|                                      |   |
|--------------------------------------|---|
| ANSI                                 | American National Standards Institute             |
| Bad Creek (or Project)               | Bad Creek Pumped Storage Project                  |
| Bad Creek II Complex or Bad Creek II | Bad Creek II Power Complex                        |
| CFR                                  | Code of Federal Regulations                       |
| Comprehensive Plan                   | Oconee County 2020 Comprehensive Plan             |
| DarkSky                              | DarkSky International                             |
| DEM                                  | Digital elevation model                           |
| Duke Energy or Licensee              | Duke Energy Carolinas, LLC                        |
| ft                                   | foot/feet   |
| ft msl                               | ft above mean sea level                           |
| EA                                   | Environmental Assessment                          |
| EIS                                  | Environmental Impact Statement                    |
| FERC or Commission                   | Federal Energy Regulatory Commission              |
| GIS                                  | Geographic Information System                     |
| HDR                                  | HDR Engineering, Inc.                             |
| IESNA                                | Illumination Engineering Society of North America |
| K                                    | Kelvin  |
| Kimley-Horn                          | Kimley-Horn and Associates, Inc.                  |
| KT Project                           | Keowee-Toxaway Hydroelectric Project              |
| kV                                   | kilovolt  |
| LED                                  | light-emitting diode                              |
| PM&E                                 | protection, mitigation, and enhancement           |
| mm                                   | millimeter  |
| NEPA                                 | National Environmental Policy Act                 |
| RC                                   | Visual Resources Resource Committee               |
| ROW                                  | right-of-way                                      |
| SCDNR                                | South Carolina Department of Natural Resources    |
| SMP                                  | Shoreline Management Plan                         |
| SMS                                  | Scenery Management System                         |
| USFS                                 | U.S. Forest Service                               |
| USGS                                 | U.S. Geological Survey                            |
| VIA                                  | Visual Impact Analysis                            |

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# 1 Project Introduction and Background

Duke Energy Carolinas, LLC (Duke Energy or Licensee) is the owner and operator of the 1,400-megawatt Bad Creek Pumped Storage Project (Project) (FERC Project No. 2740) located in Oconee County, South Carolina, approximately eight miles north of Salem. The Project utilizes the Bad Creek Reservoir as the upper reservoir and Lake Jocassee, which is licensed as part of the Keowee-Toxaway (KT) Hydroelectric Project (FERC Project No. 2503), as the lower reservoir.

The existing (original) license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) for a 50-year term, with an effective date of August 1, 1977, and expiration date of July 31, 2027. The license has been subsequently and substantively amended, with the most recent amendment on August 6, 2018 for authorization to upgrade and rehabilitate the four pump-turbines in the powerhouse and increase the Authorized Installed and Maximum Hydraulic capacities for the Project.<sup>1</sup> Duke Energy is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process, as described at 18 Code of Federal Regulations (CFR) Part 5.

In accordance with 18 CFR §5.11 of the Commission's regulations, Duke Energy developed a Revised Study Plan for the Project and proposed six studies for Project relicensing. The Revised Study Plan was filed with the Commission and made available to stakeholders on December 5, 2022. FERC issued the Study Plan Determination on January 4, 2023, which approved the Visual Resources Study as proposed.

## 2 Visual Resources Study

The Commission issued Scoping Document 2 on August 5, 2022, which identified environmental resource issues related to scenery and visual resources to be analyzed in the National Environmental Policy Act (NEPA) document developed for Project relicensing. The NEPA document will evaluate both the effects of the Project as well as the potential effects of the expanded Bad Creek II Complex (Bad Creek II Complex or Bad Creek II) construction,

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<sup>1</sup> Duke Energy Carolinas LLC, 164 FERC ¶ 62,066 (2018)

operation (including the presence of Project facilities), and maintenance activities on scenery and visual resources.

The FERC-approved Visual Resources Study includes the nine study tasks listed below.

- Task 1 – Existing Landscape Description
- Task 2 – Seen Area Analysis
- Task 3 – Field Investigation
- Task 4 – Key Views Selection
- Task 5 – Existing Visual quality Assessment
- Task 6 – Visual Analysis
- Task 7 – Visual Management Consistency Review
- Task 8 – Mitigation Assessment
- Task 9 – Conceptual Design of Bad Creek II Complex

### 3 Study Goals and Objectives

While specific requirements related to visual resource protection are not explicitly outlined by federal, state, or local agencies in the Project area, it is evident a high value is placed on preserving the natural beauty and ecological importance of the Lake Jocassee area. These agencies will continue to be informed and involved during the FERC and NEPA processes. The NEPA process requires evaluation of the potential effects on historic properties, scenic resources, and the scenic experiences of people who view the landscape. This evaluation includes a comprehensive Visual Impact Analysis (VIA). The VIA examines impacts on places and considers impacts on the people at those places and on the broader landscape. The VIA process includes the following steps.

- The VIA process starts with the identification of key viewpoints. These are locations from which the proposed project would be visible and could potentially alter the existing landscape. These viewpoints could include residential areas, public parks, historic sites, or any other locations that are frequented by the public.
- The existing visual conditions of these viewpoints are documented. This involves capturing photographs and noting the characteristics of the landscape, including landforms, water bodies, vegetation, and man-made structures.

- Visual simulations are created to show how the proposed project would alter the existing landscape. These simulations need to accurately depict the scale and appearance of the proposed project within the existing landscape.
- The simulations are evaluated to determine the level of visual impact. This evaluation considers factors such as the contrast of the project with the existing landscape, the number of people who would view the project, and the duration and frequency of the views.
- The results of the VIA are compiled into the NEPA document, either an Environmental Impact Statement (EIS) or Environmental Assessment (EA). The EIS/EA is a public document that provides full disclosure of the environmental impacts of a proposed project, including its visual impacts.

The VIA process is crucial in ensuring that the aesthetic and scenic values of the environment are considered in decision-making processes. It helps to identify potential visual impacts early in the project planning process, allowing for design modifications that can minimize these impacts.

Avoidance and mitigation measures are integral parts of the NEPA process. These measures aim to minimize or eliminate the potential adverse visual impacts of a proposed project. This could involve modifying the project design, implementing landscape treatments, or other strategies to reduce visual contrast and preserve the existing visual character of the landscape.

Conduct of this Visual Resources Study is consistent with NEPA requirements. Duke Energy's study employs standard methodologies consistent with the scope and level of effort of visual resources evaluations conducted at other FERC-licensed hydropower projects. This study is intended to provide sufficient information to support an analysis of the potential Project-related effects on visual resources, as well as potential effects or impacts due to the construction and operation of the proposed Bad Creek II Complex. The main objectives of this study are as follows:

- Describe the key scenic characteristics of the existing landscape within the study area and surrounding lands expected to potentially be within visual range of Project facilities.
- Identify areas within the existing landscape from which the existing and proposed Project facilities are or would potentially be visible.

- Identify existing Project operations and maintenance activities that affect visual characteristics.
- Evaluate expected effects of construction and operation of the Bad Creek II Complex on visual resources and proposed protection, mitigation, and enhancement (PM&E) measures.

This Visual Resources Study provides information to support the pursuit of the New License for the Project; data collected will be used to support Project feasibility and design and to assess potential effects of the proposed Project on scenery and visual resources. Due to the remote location of the dams and upper reservoir, underground location of the powerhouse, surrounding mountainous terrain, and heavily forested nature of the Project vicinity, there are limited public and (non-Duke Energy) private access areas providing views of Project facilities.

No adverse additional effects to scenery and visual resources are expected to result from the continued operation of the Project over the New License term, and no practical or necessary PM&E measures have been previously identified or proposed for existing Project structures. Therefore, this study is focused on visual effects from the potential construction and operation of Bad Creek II. These effects could include:

- land clearing and grading activities;
- creation of new upland spoil areas;
- temporary, localized turbidity impacts in the Whitewater River cove (also called Whitewater River arm);
- construction traffic; and,
- temporary construction facilities and the presence of heavy construction equipment.

The scenery in the immediate vicinity of the Project shown on Figure 3-1 would be permanently altered through the addition of Bad Creek II structures and spoil areas, though these features will be similar in appearance and adjacent to existing Project structures. The proposed expanded Project Boundary (Project area) is shown on Figure 3-1; however, the study area for the Visual Resources Study is not constrained to the expanded Project Boundary and includes lands within an approximately four mile radius of Bad Creek II features.



**Figure 3-1. Existing Project Location and Proposed Expanded Project Boundary**

## 4 Background and Existing Information

The Project is located entirely on Duke Energy-owned property except for a portion of the existing primary transmission line corridor that is currently maintained under a property easement. Excluding the Project primary transmission line, the Project is not generally visible from any state highway - it is only visible from the Bad Creek access road. The existing lower reservoir inlet/outlet structure in the Whitewater River cove of Lake Jocassee, a portion of the existing transmission yard, and the primary transmission line are the only Project structures visible to the public from Lake Jocassee.

There are numerous opportunities to enjoy nature and scenery in the immediate vicinity of the Project such as hiking, camping, fishing, hunting, scenic and wildlife viewing, and boating. The scenic conditions within the vicinity of the Project have been a consideration for Duke Energy since development of energy projects on the Keowee-Toxaway river system in the 1970s, and this commitment continues today. Duke Energy has played a significant role in protecting large amounts of nearby public recreational and conservation lands that enhance the scenery of the area.

Visual elements associated with the existing Project include the upper reservoir, the main dam, the west dam, the east dike, the equipment building, access roads, lower reservoir inlet/outlet structure and powerhouse portal area, transformer yard, switchyard (adjacent to equipment building), and primary transmission line extending from the Project transformer yard to a grid intertie station at the Jocassee Station.

During a 2013 Recreation Use and Needs Study at the KT Project (Duke Energy 2014), one third of the people surveyed stated nothing detracts from the scenic quality of Lake Jocassee. Almost half of Lake Jocassee respondents listed low-water levels as the main detractor to visual resources while in a 2007 Recreation Use and Needs Study only 36 percent of respondents listed low-water levels as a detractor. No respondents listed “development” as detracting from scenic and visual qualities of the area (Duke Energy 2014).

The KT Project Shoreline Management Plan (SMP) has provisions limiting the ability of lake neighbors to remove shoreline vegetation within the FERC Project Boundary along Lake Jocassee with the intention to provide a natural looking shoreline buffer. Additionally, following the relicensing of the KT Project, normal minimum lake elevations were increased, a new

drought protocol (Low Inflow Protocol) was put in place, and a 2014 Operating Agreement with the U. S. Army Corps of Engineers was put in place. Each of these contribute to reducing the frequency and magnitude of exposed Jocassee shorelines, improving the visual appearance for visitors.

The natural and aesthetic character of Lake Jocassee, the Foothills Trail, Whitewater Falls, and non-developed, forested areas surrounding the Project contribute to the recreational and cultural value of the Project vicinity, within the Blue Ridge Mountains in the Upstate of South Carolina. The existing Project facilities have been in place since Project construction was completed in the early 1990s, and the Project has actively operated since that time.

The construction of Bad Creek II would include a new underground powerhouse and associated structures as well as a new inlet/outlet structure adjacent to the existing structure in Lake Jocassee. Similar to the existing lower reservoir inlet/outlet structure, following completion of construction, the new inlet/outlet structure would be viewable by the public via boat (primarily from the Whitewater River cove). With the construction of Bad Creek II, the visual landscape would be altered during and after construction.

## 5 Methods

Study objectives are to provide information needed to determine the potential direct, indirect, and/or cumulative effects of proposed Project facilities on scenic and visual resources. The results of this study, in conjunction with existing information, will be used to inform analysis in and recommendations for the New License application regarding potential Project effects on visual resources and potential PM&E measures to be included in the New License.

This study was conducted in consultation with the Recreational and Visual Resources Resource Committee (RC)<sup>2</sup> and state and federal resource agencies. Appendix A includes meeting summaries and stakeholder consultation associated with the Visual Resources Study.

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<sup>2</sup> Recreational and Visual Resources RC participants include the following organizations: Advocates for Quality Development; Foothills Trail Conservancy; Friends of Lake Keowee Society (FOLKS); South Carolina Department of Natural Resources (SCDNR); South Carolina Department of Parks and Recreation; Upstate Forever.

## 5.1 Task 1 – Existing Landscape Description

Available information for the study area was reviewed to characterize the existing landscape and develop a baseline description for key scenic characteristics and scenic quality of the landscape within the proposed expanded Project area. The Project area and surrounding lands expected to potentially be within visual range of Bad Creek II facilities were assessed and key elements including landforms and terrain (i.e., slope); water features; vegetative cover type, pattern, height, and distribution; soils; geology; and cultural features (i.e., developed uses and structural modifications of the natural landscape) were identified. Information sources included U.S. Geological Survey (USGS) topographic maps and the Multi-Resolution Land Characteristics Consortium National Land Cover Database (2021); federal, state, and local government planning documents that include information on scenic and visual resource conditions; and photographs and aerial/satellite imagery (Google Earth 2022). While the study area for the Visual Resources Study focuses on the upper reservoir, lower reservoir, primary transmission line alignment, and main (expanded) facility site, the area included in the existing landscape description evaluation encompasses a larger area to provide a description and understanding of the landscape context of the Project area.

Relevant management activities and/or regulation of the scenic resources within the Visual Resources Study area, including vegetation management and Project operations, were also reviewed.

## 5.2 Task 2 – Seen Area Analysis

The seen area (viewshed) analysis identified areas within the existing landscape from which elements of the proposed Bad Creek II facilities would potentially be visible. The seen area analysis evaluated the locations for the proposed inlet/outlet structures for the upper and lower reservoirs, switchyard, transformer yard, spoil areas, potential temporary access road, and expanded primary transmission line corridor. The seen area analysis was used to identify potential Key Views for field investigation and the visual quality assessment and impact analysis.

The seen area analysis methodology was based on the use of standard Geographic Information System (GIS) tools for calculating viewsheds based on a digital elevation model (DEM) and a set

of observer points. The model analysis used the observer dataset and a DEM raster dataset to analyze which cells can be seen by the observer and which cannot, typically because a landform feature blocks the sight line.

Kimley-Horn and Associates, Inc. (Kimley-Horn) performed the seen area analysis using the Viewshed Analysis Spatial Analyst Tool in ESRI ArcGIS Pro software. The data utilized to perform the analysis were USGS DEM data, which are bare earth data that do not account for trees, buildings, or other surface objects. This represents line-of-sight conditions based only on topography. Because the Project area is predominantly forested, the bare earth seen area analysis results are a conservative representation of potential visibility. The seen area analysis also did not account for the effects of atmospheric conditions such as humidity, cloud cover, or fog. The effects of revegetation of spoil areas and the potential temporary access road (i.e., Fisher Knob Access Road) were also not incorporated in the analyses. Because the site design for Bad Creek II has not yet been finalized, conservative assumptions were used when conducting the seen area analysis as described below:

- **Transformer Yard Design:** The proposed transformer yard was modeled as a solid block.
- **Spoil Areas:** Where side slopes for potential spoil area were not available, the spoil areas were modeled as straight-sided features.
- **Primary Transmission Line Towers:** For purposes of the seen area analysis, Duke Energy assumed a transmission tower would be constructed parallel to each existing primary transmission line transmission tower.
- **Temporary Fisher Knob Access Road:** When the seen area analysis was run, two potential routes for the temporary access road were under consideration. While one of the routes has now been eliminated, both routes are reflected in the analysis.

The analysis was run from the perspective of Bad Creek II features looking out over the landscape. These results can be used inversely to identify points in the landscape with direct views of project features.

Observer points refer to the locations from which the analysis of the observed area is conducted. They were selected based on the shape, type, and proposed top elevation of proposed features to

be analyzed. Points features were used for the proposed towers; corners were used for rectilinear pad features such as the switchyard and the transformer yard. Lines features were used when analyzing features of greater complexity such as the proposed access road, spoil areas, and upper contours of inlet/outlet structures. The analysis then calculated the area that can be seen from observer points, displaying visible/not visible of the tip elevation as a single color. One feature, like a transformer pad or a proposed road, had multiple observer points used to mark the corners of the pad or the centerline of the road. For these features, the viewshed output displays a gradient of color representing the lowest number of observer points to highest number visible in the surrounding landscape.

The general process for the analysis followed the following sequence: USGS 1/3 arc-second (10-meter) DEM data were downloaded for the study area. DEM tiles were merged using the Mosaic to new Raster tool. Then the data were converted from meters to feet using the Spatial Analyst Math tool using the projection North American Datum of 1983 State Plane South Carolina State Plane coordinates system (U.S. Feet). HDR Engineering, Inc. (HDR) provided contour/elevation data for proposed Bad Creek II features. Point or line observer features for each element were imported into ESRI ArcGIS from AutoCAD at the associated X-Y coordinates and assigned proposed Z-values (elevations). The ESRI ArcGIS Pro Viewshed Spatial analyst tool was used to run the analysis and the viewshed output symbology was adjusted to display color where observer points can be seen and no color where the observer points cannot be seen.

The final seen area maps in Section 6.2 show a color gradation, with darker color indicating more observation points of the feature are visible. Areas of the landscape with a color, even pale, indicate at least a portion of the project feature is visible.

## 5.3 Task 3 – Field Investigation

This task involved a field investigation of the potential Key Views identified during Task 4 as described in Section 5.4 below. Photographs and field records were logged and organized immediately following the field investigation (Appendix B).

The field work to collect photos included a three-person field crew. The field crew recorded location points for each simulation viewpoint to ensure repeatability and multiple site

photographs were collected at each location. For each inventory point, the following information was collected:

- Location (i.e., coordinates)
- Heading of camera view
- Time
- Conditions – atmospheric conditions<sup>3</sup>, field notes

This field investigation was conducted on December 11, 2023, during leaf-off conditions.

## 5.4 Task 4 – Key Views Selection

The objective of Task 4 was to identify a set of Key Views (up to four) that adequately covers the range of visibility and potential scenic and visual impacts of Bad Creek II. Considerations in selecting specific Key Views included viewing distance to ensure adequate representation of potential foreground, middle ground, and background views of the proposed Bad Creek II features; viewing direction; and the types of viewer groups (residents, recreational users, and motorists) that might experience views of the Project facilities.

Based on the results of the seen area analysis developed for Task 2, travel routes, and potential viewer characteristics, HDR and Kimley-Horn identified 11 potential Key Views. The RC evaluated these sites during its July 27, 2023, RC meeting and selected six for field investigation<sup>4</sup>.

Based on RC requests to evaluate the potential effects of additional lighting associated with Bad Creek II, Duke Energy used a similar process to identify potential locations for lighting visualizations in consultation with the RC<sup>5</sup>.

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<sup>3</sup> Humidity and windspeed were obtained from Lake Jocassee Station [Greer, SC undefined | Weather Underground \(wunderground.com\)](#). Accessed on February 7, 2024.

<sup>4</sup> See Appendix A for a summary of the July 27, 2023, meeting discussion.

<sup>5</sup> See Appendix A for the October 11, 2023, email requesting RC input regarding potential locations for nighttime views.

Following acquisition of the photographs at the potential daytime Key views, the RC met on January 11, 2024, to finalize the Key Views<sup>6</sup>. (See Appendix B for all the views reviewed by the RC.)

## 5.5 Task 5 – Existing Visual Quality Assessment

This task involved assessing the existing scenic and visual quality at each Key View identified in the Key Views Selection task. The assessment was based on consideration of the standard visual elements (form, line, color, texture, and pattern), the apparent naturalness of the landscape as seen from the specific Key View, and the degree of human modification of the landscape.

Scenic and visual quality were evaluated using concepts from the U.S. Forest Service (USFS) Scenery Management System (SMS), which includes landscape character descriptions and scenic integrity objectives for USFS landscapes that can be used to help assess the compatibility of a proposed project with the surrounding landscape. The evaluation took into account a wide variety of landscape characteristics, such as:

- Slope
- Vegetative cover type, pattern, height, and distribution
- Water
- Color, texture, line
- Effects of adjacent scenery
- Cultural modifications

Distance zones are used to describe how viewers see the landscape. The SMS identifies four distance zones:

- Immediate foreground (0 to 300 feet);
- Foreground (300 feet to 0.5 mile);
- Middle ground (0.5 mile to 4 miles); and
- Background (4 miles to the horizon).

Immediate foreground and foreground views tend to highlight details ranging from individual leaves to individual trees. The middle ground “is usually the predominant distance zone at which

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<sup>6</sup> See Appendix A for a summary of the January 11, 2024, RC meeting to select the Key Views.

National Forest landscapes are seen, except for regions of...tall, dense vegetation.” In the background, “texture has disappeared, and color has flattened, but large patterns of vegetation or rock are still distinguishable” (USDA 1995).

Scenic classes, as defined in the SMS, recognize the idea that all National Forests have “value” as scenery (USDA 1995). The classes, which range from 1 (most valuable scenery) to 7 (least valuable scenery) can be used to consistently evaluate the scenic value and relative scenic importance of a particular area. They are used in forest planning to compare values of scenery with other types of resources. The higher the scenic value (i.e., Scenic Classes 1 and 2), the more important it is to maintain.

Scenic Integrity Objectives range from very high to very low and express the desired future aesthetic condition of a forest. Scenic Integrity Objectives descriptions, as defined below, generally express a comparison to existing or preferred conditions (USDA 1995):

- **Very High:** “landscapes where the valued landscape character ‘is’ intact with only minute if any deviations.”
- **High:** “landscapes where the valued landscape character ‘appears’ intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident.”
- **Moderate:** “landscapes where the valued landscape character ‘appears slightly altered.’ Noticeable deviations must remain visually subordinate to the landscape character being viewed.”
- **Low:** “landscapes where the valued landscape character ‘appears moderately altered’ Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes or architectural styles outside the landscape being viewed.”
- **Very Low:** “landscapes where the valued landscape character ‘appears heavily altered.’ Deviations may strongly dominate the valued landscape character.”

## 5.6 Task 6 – Visual Analysis

This task involved specific assessment of the expected scenic and visual impact at each Key View, based on changes in landform and changes to or additional structures, to determine the potential extent of visual contrast introduced by the proposed Bad Creek II Complex, and the expected viewer response to those changes.

HDR developed visual simulations of Bad Creek II features that were used to provide the basis for the visual analysis, which included assessing the effect of Bad Creek II on landscape

character and scenic integrity. In the visual simulation process, a rendered image from a digital three-dimensional (3D) model of the proposed project-build scenario was integrated with the existing conditions photography. Using project design and location specific information, HDR built a 3D model using Autodesk 3DS Max. The model included the topography of the Project area and sufficient perimeter (i.e., buffer) around Bad Creek II features to include, at a minimum, the area between Bad Creek II features and the subject Key Views. All proposed facility components (i.e., Bad Creek II primary transmission line, transformer yard, switchyard, lower reservoir inlet/outlet structure, spoil disposal areas, temporary access road, etc.) were also built and simulated in the model. A virtual sun was created in the model with real-world attributes, such as locational data along with date and time, to match the selected photographs, and virtual cameras were also created in the model with the same parameters as the actual Key View photos used to match the perspective of each photograph. Finally, V-Ray rendering engine for 3DS Max was used to produce the rendering of proposed conditions, and Photoshop was used to combine the rendering with the photographs. (See Appendix C for annotated visualizations.)

These proposed facility elements were then assessed in terms of their level of impact based on setting and viewer characteristics. Contrast was assessed by considering the differences in form, line, color, texture, scale, and landscape juxtaposition between existing conditions and proposed conditions. Considered in terms of the setting, the assessment of impacts was made based on proximity to views—that is, whether the project element is within the foreground, middle ground, or background in relation to the viewpoint. The visual impact assessment consists of an overlay of Contrast, Landscape Characteristic, and Views to determine whether the alternative is dominant to the characteristic landscape, subordinate to the characteristic landscape, or somewhere in between. Impact results derived for the individual Key Views were aggregated and evaluated to provide an overall assessment of the visual impacts of the proposed Bad Creek II Complex.

## 5.7 Task 7 – Visual Management Consistency Review

This task involved review of the consistency of the proposed Bad Creek II Complex and expanded Project area with visual resource protection guidance established in applicable land use plans and regulations, to the extent that such guidance exists. This task involved review of USFS

forest management plans, SCDNR's plan for the management of the Jim Timmerman Natural Resources Area at Jocassee Gorges, Oconee County's Comprehensive Plan, and the KT SMP.

## 5.8 Task 8 – Mitigation Assessment

This task involved identification and assessment of potential mitigation measures that would address the scenic and visual effects of the Bad Creek II Complex identified during the visual quality assessment and visual management consistency review. Measures that could reduce the contrast created by the proposed Bad Creek II facilities, and thereby reduce the level of scenic and visual impact, were identified. Potential measures were evaluated in terms of their physical feasibility, approximate cost, and effectiveness in reducing contrast and visual impact.

## 5.9 Task 9 – Conceptual Design of Bad Creek II Complex

This task assessed, to the extent possible, visual resource conditions relative to site layout, conceptual designs, proposed construction processes, and lighting. A rendering of the conceptual Bad Creek II site layout was produced. In addition, relevant existing management plans and guidance documents related to lighting were evaluated.

The following assumptions were used to develop the proposed conceptual design rendering:

- **Spoils areas:** Duke Energy has identified 13<sup>7</sup> potential spoil area locations for permanent storage of excavated materials (earth and rock) but does not plan to use them all. Eleven of the potential locations are in upland areas while the other two are in the upper and lower reservoirs. To provide a conservative (i.e., most impactful) representation of potential effects associated with spoil areas, all upland spoil areas were incorporated in the rendering using the crest or peak elevations in Table 5-1.

Duke Energy will revegetate spoil areas at the completion of construction. Therefore, the appearance of these areas will change over time as vegetation grows and develops.

However, for purposes of developing the conceptual site layout, Duke Energy has based the rendering on projected appearance approximately five years after construction and revegetation is complete.

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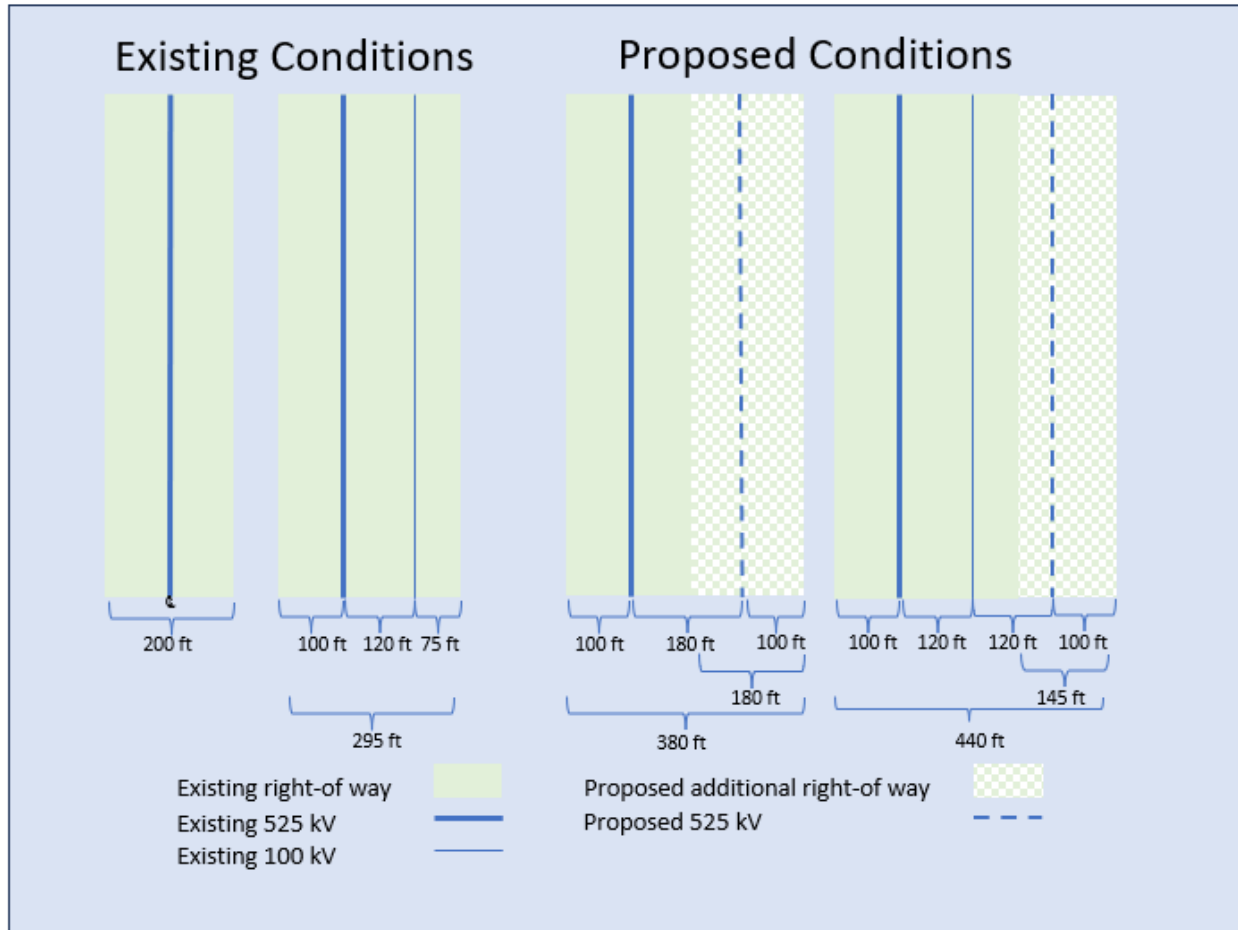
<sup>7</sup> Two spoils areas, A and H, would be located within reservoirs and would not be visible.

**Table 5-1. Spoil Area Crest / Peak Elevations**

| Spoil Area | Elevation (ft msl) |
|------------|--------------------|
| <b>B</b>   | 1,826.0            |
| <b>C</b>   | 1,874.0            |
| <b>D</b>   | 1,885.0            |
| <b>E</b>   | 2,240.0            |
| <b>F</b>   | 2,000.0            |
| <b>G</b>   | 2,270.0            |
| <b>I</b>   | 2,338.0            |
| <b>J</b>   | 1,930.0            |
| <b>K</b>   | 2,436.0            |
| <b>L</b>   | 2,348.0            |
| <b>M</b>   | 1,885.0            |

*Ft msl – feet above mean sea level*

- Primary transmission line right-of-way (ROW) width:** The proposed transmission line would adjoin the existing primary transmission line that ties into the Jocassee switchyard. A portion of the existing primary transmission line ROW is occupied by a single 525-kilovolt (kV) line while the southern portion of the ROW is occupied by a 525-kV and 100-kV line. The amount of additional ROW width that would be needed is anticipated to be 180 ft or 145 ft, depending on the number of lines present, as shown on Figure 5-1.



**Figure 5-1. Additional Right-of-Way Widths Associated with the Bad Creek II Transmission Line**

## 6 Study Results

### 6.1 Task 1 – Existing Landscape Description

#### 6.1.1 Introduction

The existing landscape description provides existing available information in the study area to characterize the existing landscape within the proposed Bad Creek II area and the scenic quality of the surrounding landscape. This review establishes a baseline for existing conditions and character that proposed changes can be evaluated against. The management plans of landscape level scenic resources near the Project area are also reviewed, characterizing Project operations and vegetation management that may impact visual resources within the study area. The character of the existing landscape is described using the fundamental visual elements of form, line, color, texture, and pattern.

The Project is situated within the Blue Ridge Mountains in the Upstate of South Carolina (Figure 6-1). The existing landscape and scenic attributes in the vicinity are dominated by rolling hills, forests, stream corridors, steep slopes, waterfalls, rock outcrops, and mountain ridges. The areas surrounding the Project area are primarily undeveloped forest land managed by the USFS and the SCDNR. Although there is some residential and recreational development around Lake Jocassee, the shoreline is mostly forested with a mixture of pines and hardwoods. The area is characterized by ridges and narrow stream valleys, many with numerous waterfalls, which drain into Lake Jocassee. Surrounding protected lands include the Sumter National Forest, Nantahala and Pisgah National Forests, and the Jocassee Gorges. The area overall can be characterized as scenic mountain wilderness and is aesthetically appealing.

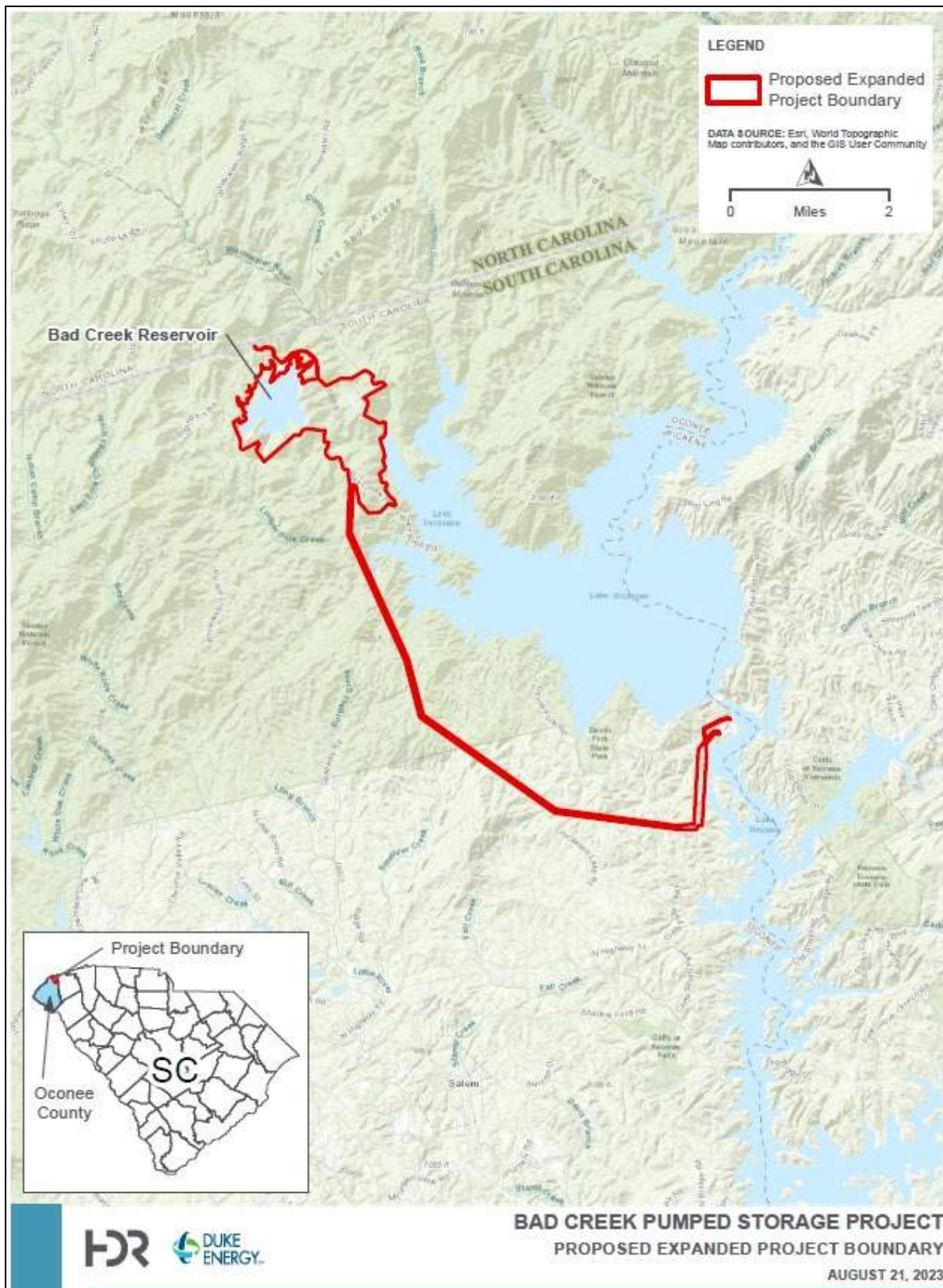


Figure 6-1. Bad Creek Project and Vicinity

## **6.1.2 Elements of the Existing Landscape**

### **6.1.2.1 Project Terrain**

The Project is located in the Blue Ridge physiographic province, a mountainous zone extending northeast-southwest from southern Pennsylvania to central Alabama, varying in width from less than 15 miles up to 70 miles. The region includes diverse topography, rugged mountainous terrain, and rolling hills typical of Transylvania County, NC and Pickens and Oconee counties, SC. Drainage is generally to the west; however, the slopes separating the Blue Ridge from the Piedmont physiographic province are typically steep and provide the initial run-off (headwaters) for some of the largest streams of the Piedmont province, which drain to the east and southeast. The underlying geologic structure in the region influences local topography. Streams are deeply incised, and the average relief is about 1,800 ft msl. The area includes watersheds of Lake Jocassee, and the Blue Ridge Mountains, Brevard Fault Zone, and Chauga belt geological regions. Topographic features in the area have been formed over millions of years by tectonic forces, erosion, and weathering. The physiography of the area comprises a series of mountain valleys flanked by steep mountain ridges.

### **6.1.2.2 Elevation**

The Project sits on an elevated ridge system which surrounds the Bad Creek Reservoir at an elevation of approximately 2,400 feet ft msl. Elevations surrounding the site range from 800 ft to over 3,900 ft with Flat Mountain (3,929 ft) being the highest point in the area. Higher elevations (1,500 - 3,900 ft) are typical of areas north of the site and are characterized by several mountains within the Blue Ridge Mountain Range. The tallest peak in South Carolina, Sassafras Mountain (3,554 ft), is 14 miles east of the Project. Mountains, ridges, and knolls to the north and west of the site feature higher elevations than the site topography. These include Flat Mountain (3,929 ft), Round Mountain (3,690 ft), and Grassy Knob (3,411 ft) to the north, Persimmon Mountain (3,060 ft) to the west, and Limber Pole Mountain (2,000 ft) to the south. Landforms and elevations to the south and east of the reservoir are characterized by ridge and valley systems associated with watersheds draining into Lake Jocassee and the Keowee River valley. This includes Whitewater Mountain (2,276 ft), Gallbuster Mountain (2,123 ft), and Musterground Mountain (2,319 ft).

Each of the higher elevation points noted above offers potential sightlines towards proposed Bad Creek II features.

Lower elevations are to the south and east of Bad Creek Reservoir and are associated with the watersheds and hydrological and geological features of the many watersheds draining to Lake Jocassee and Lake Keowee. These include Hester Mountain (1,565 ft), Fisher Knob (1,515 ft), and Double Spring Mountain (2,056 ft) to the southeast. McKinney's Mountain (1,938 ft) and Tater Hill (1,666 ft) lie south of the site. This area includes gentler topography encompassing large areas of hills, valleys, and Lake Jocassee, and the topography of these areas is contrasted by the surrounding ridges, knolls, and mountainous topography.

### **6.1.2.3 Landforms**

As mentioned above, landforms are diverse and are characterized by the underlying geology of the region and the various natural forces acting on it. They are classified into three orders by scale. First order landforms include continents and ocean. Second order landforms are significant large-scale masses formed through tectonic action. Within the study area, second order landforms include steep mountain terrain, peaks, ridges, hills, plateaus, and plains. Third order landforms and topographic features are created through weathering, erosion, and deposition. Within the study area, these include escarpments, gorges, and other features unique to the region.

### **6.1.2.4 Slopes**

The geology and hydrology of the region includes floodplains, hills, steep ridges, and cliffs with slopes ranging from 0 to over 100 percent<sup>8</sup>, with sheer cliffs. Approximately 36 percent of the study area has slopes from 50-83 percent, indicative of the differentially weathered character of the mountainous terrain and escarpments. Approximately 43 percent of the area's slopes range from 25-50 percent, often associated with the foothills and drainages of the steeper and eroding topography. The remaining slopes, approximately 21 percent, have 0-10 percent slope and are associated with the floodplains and transition slopes of lowlands, as well as plateaus and gentle knolls of intermediate elevations.

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<sup>8</sup> A slope percent of 100% corresponds to a 45° angle.

#### **6.1.2.5 Water Features**

The Project region includes the Savannah River Basin and its many drainages which provide the physical framework for the waterbodies that are defined by them. Waterbodies and features in the area include streams, creeks, falls, rivers, lakes, ponds, and reservoirs. They are defined by the interactions of water and erosion on the landforms and geology of the area which are defined by the elevational transition of the Blue Ridge Mountain region to the piedmont region of the Carolinas and the Jocassee escarpment. The Project complex is primarily in the Whitewater River subbasin, but the Project primary transmission line extends into the Upper Little River-Lake Keowee and the Cane Creek-Lake Keowee subbasins.

Lake Jocassee and, to a lesser extent the Whitewater River, dominate the water-based visual resources at the Project. Lake Jocassee is fed by several cold-water rivers which result in cool and clear water throughout the year. Primary inflows to Lake Jocassee include Whitewater River, Thompson River, Horsepasture River, and Toxaway River. Lake Jocassee is an approximately 7,980-acre, 300-ft-deep reservoir impounded in 1973.

The Whitewater River and its upper and lower falls are dramatic and are a regional recreation destination for hikers and other recreationists. The Upper Whitewater Falls is the highest waterfall east of the Rockies and drops 411 ft. The Lower Whitewater Falls drops another 200 ft across the escarpment. Numerous other waterfalls can be found in the area including falls that flow directly into Lake Jocassee.

#### **6.1.2.6 Water Quality**

Water quality in the Jocassee watershed is high to excellent due to the forested, undeveloped nature of the watershed; many streams that flow directly into the lake are headwater streams that drain pristine areas (Duke Energy 2022). Many of the streams and tributaries include healthy populations of aquatic invertebrates and fish that are sensitive to watershed and soil disturbances (i.e., increased sediments in the streams) and their presence is indicative of healthy waters supportive of critical habitat. Under the authority of the South Carolina Pollution Control Act, the SC Department of Health and Environmental Control Water Classification & Standards is responsible for establishing appropriate water uses and protection classifications, as well as general rules and specific water quality criteria in order to protect existing water uses, establish anti-degradation rules, protect public welfare, and maintain and enhance water quality. Streams

with the following Water Classifications are found within the Project Vicinity: Outstanding Resources Waters (ORW); Trout Natural (TN); and Trout Put, Grow, and Take (TPGT). The uses are indicative of the desired water quality needed to support designated uses.

Duke Energy has monitored water quality conditions in Lake Jocassee in some capacity since its formation. The South Carolina Department of Health and Environmental Control has consistently identified Lake Jocassee (as well as downstream Lake Keowee) among the cleanest South Carolina reservoirs based on data from 1980-1981, 1985-1986, and 1989-1990 studies (USACE 2014). Lake Jocassee is one of only a few reservoirs in South Carolina that possesses the necessary aquatic habitat (water temperatures and dissolved oxygen) to support both a warmwater and a coldwater (salmonid [trout]) fishery year-round (USACE 2014).

#### **6.1.2.7 Landcover**

The Project region includes the diverse land cover typologies and plant communities defined by the area's elevation, slopes, soils, hydrology, and human activity. The area is dominated by mixed forest, deciduous forest, evergreen forest, and open water bodies. Secondary land cover types include pasture, crop land, barren, and developed land. Higher percentages of complete forest cover of various types exist farther beyond Lake Jocassee's immediate vicinity, while areas around the lake tend to have more developed and or barren cover due to development activities associated with parks, residential development, and infrastructure. Land coverage according to the 2021 National Land Cover Database within the study area (excluding the transmission line area) is dominated by forest cover (56%) and water bodies (22%). Pasture, crop land, scrub, and herbaceous cover entails approximately 15 percent of the study area with the remaining 6.6 percent is generally developed or barren land. Beyond the Project area, forest cover dominates at over 84 percent with open water accounting for another 8 percent and developed space for just less than 4 percent.

The study area includes diverse tree species and forest types. The area was intensively logged in the past. This has resulted in a mosaic pattern of three predominant forest types (oak-hickory forest, mixed pine-hardwood stand, and naturally occurring stands of white pine) broken by the occasional patch of developed or bare land. Despite past logging and disturbances, old-growth patches of hemlock, white pine, and yellow poplar trees remain. Most of the current stands of forest include middle to late successional forest types. These yield a mix of canopy species

approaching 100 ft in height. The variety of semi-mature and mature vegetation serves to shade riparian habitats, stabilize steep slopes, and provides buffers that obscure sight lines.

#### **6.1.2.8 Geology**

The crystalline rocks of the southern Appalachians occur in northeast-trending parallel geologic terranes. The Bad Creek Project is situated within the Tugaloo terrane, which includes rocks of the eastern Blue Ridge province northwest of the Brevard zone (Hatcher et al. 2007; Hatcher 2002). The Blue Ridge province is a complex crystalline terrane consisting of Precambrian gneissic basement rocks structurally overlain by metasedimentary and metavolcanic rocks of Precambrian to lower Paleozoic age (Hatcher 1978a, 1978b). The structure of the Blue Ridge province is controlled by major thrust faults, folding, and faulting (Hatcher 1978a; Clendenin and Garihan 2007a, 2007b).

Sassafras Mountain and the Blue Ridge Escarpment lie within the inner Piedmont belt. It is believed that this highly eroded thrust sheet was attached to the North American plate during the Taconic orogeny. Colliding tectonic plates during the Acadian and the Alleghanian orogenies created pressure and heat which turned sedimentary and igneous rocks into the schists, gneiss, and metagranites that are commonly seen in the area. Faulting and uplifting during the Mesozoic period and Oligocene to the Miocene periods created the area's many gorges and waterfalls as well as vistas including Jumping Off Rock and Sassafras Mountain and gorges harboring waterfalls and cascades such as Laurel Fork Falls, Whitewater Falls, and Eastatoe Gorge.

The Project vicinity is considered to have low to moderate seismic risk, with no known Quaternary/active faults (USGS 2014a, 2014b, 2018).

#### **6.1.2.9 Soils**

While the type of underlying bedrock (parent material) typically dictates which soils are predominant in an area, climate, relief, the presence of organisms, and passage of time are also important soil formation factors. In the vicinity of the Project, the landscape influences soil formation through its effects on erosion, moisture, temperature and plant cover, and differences in slope and aspect.

The soils of the Project vicinity are diverse. In general, soils surrounding Lake Jocassee and Bad Creek are consistent because of the similar geologic conditions and topography in the reservoir

area. Soils are typically sandy loam derived in place from metamorphic bedrock. Although the soils are typically sandy loam at the surface, these units often include a sandy clay, clay or clay loam subsoil. Several soil types include a significant percentage of gravelly or cobbly soil. They are typically underlain by saprolite or weathered rock at depths ranging from 10 to greater than 60 inches. In some locations, weathered or unweathered bedrock may be present below the surface soils at depths as shallow as 1 to 2 ft. Depths to weathered or unweathered crystalline bedrock are several tens of feet or more.

The geology, and soils of the area combined with mild temperatures and a high average annual rainfall supports a unique diversity of flora and fauna as well as habitats for endemic rare and endangered species.

#### **6.1.2.10 Cultural Features**

Much of the Project vicinity is a rural and scenic setting. There is abundant land set aside for conservation open space, national forests, wilderness areas, and wildlife management areas. The region is marketed as a mountain wilderness tourist destination, known for mountain views, waterfalls and creeks, and rare plant communities. There is very little human development in the area, with limited residential development and water access points along the shores of Lake Jocassee. The most visually impactful human development in the area are the existing Project and its primary transmission line as well as the homes within the Fisher Knob community along the western shoreline of the Whitewater River cove.

#### **6.1.2.11 Infrastructure**

##### ***6.1.2.11.1 Roads***

The local area surrounding the Project has few roads, in part because of the mountainous terrain and the remote nature. South Carolina state routes 107 and 130 run north-south, 4 and 2 miles west of Lake Jocassee, respectively; SC Highway 178 runs north-south 7 miles east of Lake Jocassee, and Route 11 runs east-west 2 miles south of Lake Jocassee. In North Carolina, highway 64 runs east-west. There are several small secondary roads in the area that provide access to residential areas and parks, but much of the area does not have roads. The roads are all two-lane routes.

The Oscar Wigington Scenic Byway is a 20-mile designated section of SC 107 and SC 281 running from the North Carolina border through Sumter National Forest, with the Oscar Wigington Overlook on SC 413 offering views of Lake Jocassee and the Blue Ridge Mountains.

#### ***6.1.2.11.2 Utilities***

The Project is the most visually apparent utility in the area. Visible features include the upper reservoir, lower reservoir inlet/outlet structure, transformer yard, switchyard, ancillary buildings, parking lots, dams, access roads, and graded and revegetated spoil areas. The total area of land associated with the existing Project, excluding utility corridors and open water, is approximately 200 acres.

Jocassee Pumped Storage Station is at the southern end of Lake Jocassee. Other than the dam itself, the spillway, and intake structure, most facility features are on the downstream side of the dam, visually shielded from boaters at Lake Jocassee.

The Project primary transmission line extends approximately 9.25 miles from the existing Project switchyard south and east to the Jocassee Pumped Storage Station on the southern end of Lake Jocassee. As discussed in Section 5.9, the primary transmission line corridor ranges from approximately 200 to 300 ft wide and serves a 525kV line on towers that are approximately 130 ft tall. The corridor cuts through mixed hardwood and pine forests on mountainous terrain. The towers are often located on high elevation points spanning ravines to reduce environmental effects of corridor maintenance.

#### ***6.1.2.11.3 Development***

There is limited human development in the area around the Project. There are lakeshore residences with docks around Lake Jocassee as well as public boat launch points at Devils Fork State Park on the southwest shore of Lake Jocassee. The area to the south of Lake Jocassee near Jocassee Dam has additional residential and mixed development with additional land clearing.

### **6.1.2.12 Recreation**

#### ***6.1.2.12.1 Parks and Conservation Areas***

The Project area has numerous parks and other conservation open space areas as shown in Figure 6-2. These include Sumter National Forest in South Carolina, Nantahala National Forest in North

Carolina, the Toxaway Game Lands, Gorges State Park, Devils Fork State Park, and Keowee-Toxaway State Park. These resources provide numerous recreational opportunities.

The Jim Timmerman Natural Jocassee Gorges Natural Area (Jocassee Gorges) encompasses a large conservation open space area along the northern and eastern shores of Lake Jocassee. Jocassee Gorges is approximately 43,500 acres and is a Wildlife Management Area operated by SCDNR. Jocassee Gorges is a remote recreation destination with waterfalls, backcountry hiking and camping opportunities, fishing access, scenic driving routes, and overlooks.

The 600-acre Devils Fork State Park is located near Jocassee Pumped Storage Station and offers public boat ramps and canoe/kayak launches, as well as camping and cabin rental.

Lake Jocassee (Figure 6-3) itself is a recreational destination that offers boating and other aquatic recreational opportunities for lakeside residents and area visitors. Fishing, boating, kayaking, water skiing, scuba diving, and other water-based activities are available.

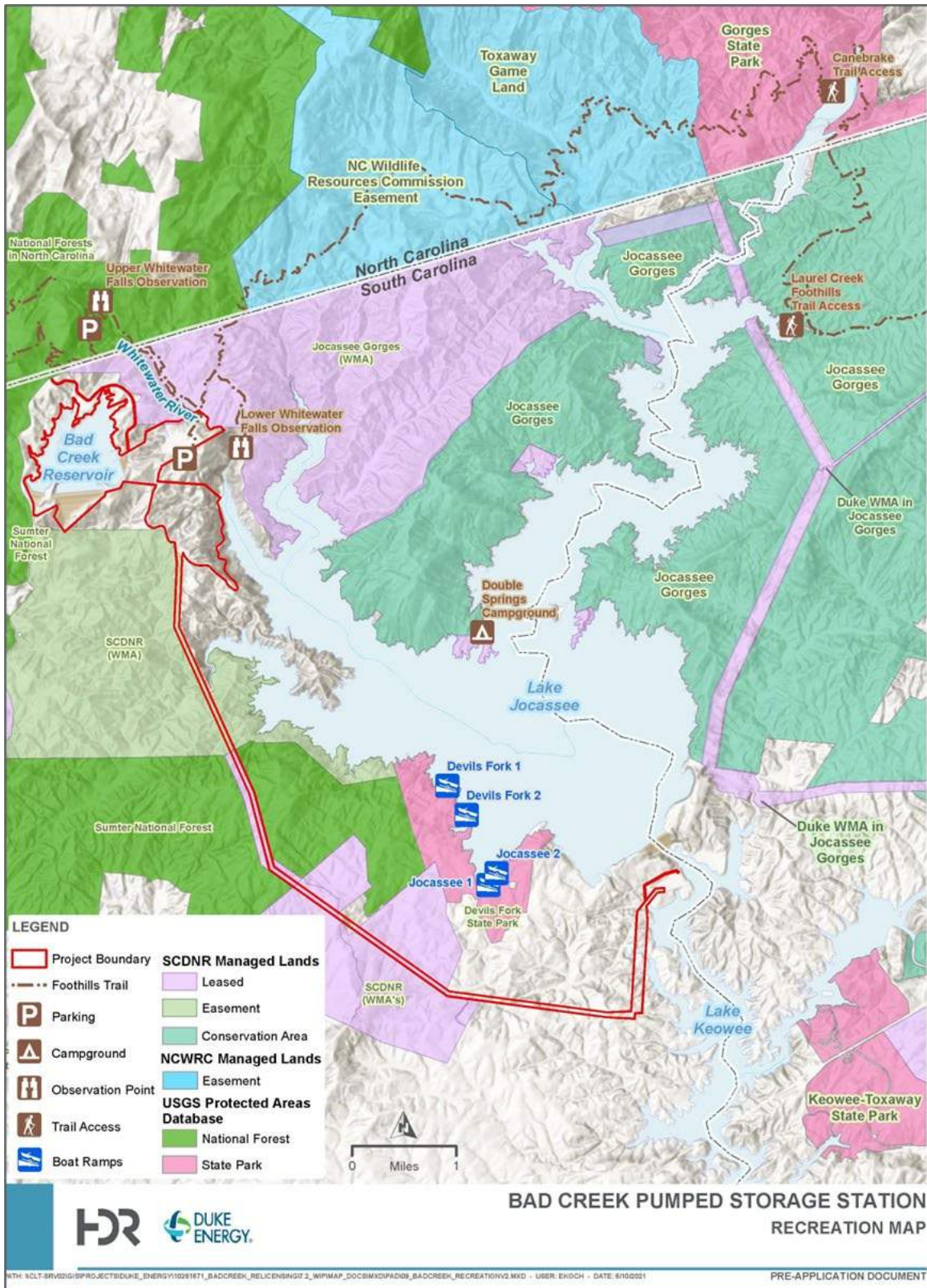


Figure 6-2. Recreational Resources near the Project



**Figure 6-3. Lake Jocassee Looking South (Whitewater River cove right side of photo)**

#### ***6.1.2.12.2 Recreational Sites***

Recreational sites near the Project include hiking trails, waterfalls, and scenic overlooks. The Whitewater River has two destination waterfalls. The trailhead for the Lower Whitewater Falls is adjacent to the Project office complex. The two-mile trail continues to an observation deck on the eastern bank of the gorge, offering views of the falls (Figure 6-4). A half-mile upstream in North Carolina is Whitewater Falls, the highest waterfall east of the Rockies (USFS 2023b). Whitewater Falls is in the Nantahala National Forest and the section of the river from the state line upstream was designated as a newly eligible Wild & Scenic River in the 2023 Nantahala Pisgah National Forest Land Management Plan.



**Figure 6-4. Lower Whitewater Falls as viewed from the Lower Whitewater Falls Overlook**

Hikers can access both falls via the Foothills Trail, a designated national recreation trail. Located in Upstate South Carolina and Western North Carolina, the trail is 77 miles long. The trail is popular with backpackers as well as day hikers. The trail passes west of the Project through Sumter National Forest, crosses the North Carolina border into Nantahala National Forest, dips back into South Carolina to follow the Whitewater River before turning north again into North Carolina, ultimately ending at Table Rock State Park, South Carolina. The trailhead and parking lot for the Lower Whitewater Falls is an access point for the Foothills Trail.

Duke Energy provides a visitor overlook and pullover on Bad Creek Road approximately 0.8 miles south of the existing lower reservoir inlet/outlet. The overlook provides over 180-degree views north, east, and south across Lake Jocassee and the Blue Ridge Mountains beyond. The

pull off includes a dedication monument by Duke Energy to the workers who developed the Project and a selfie frame.

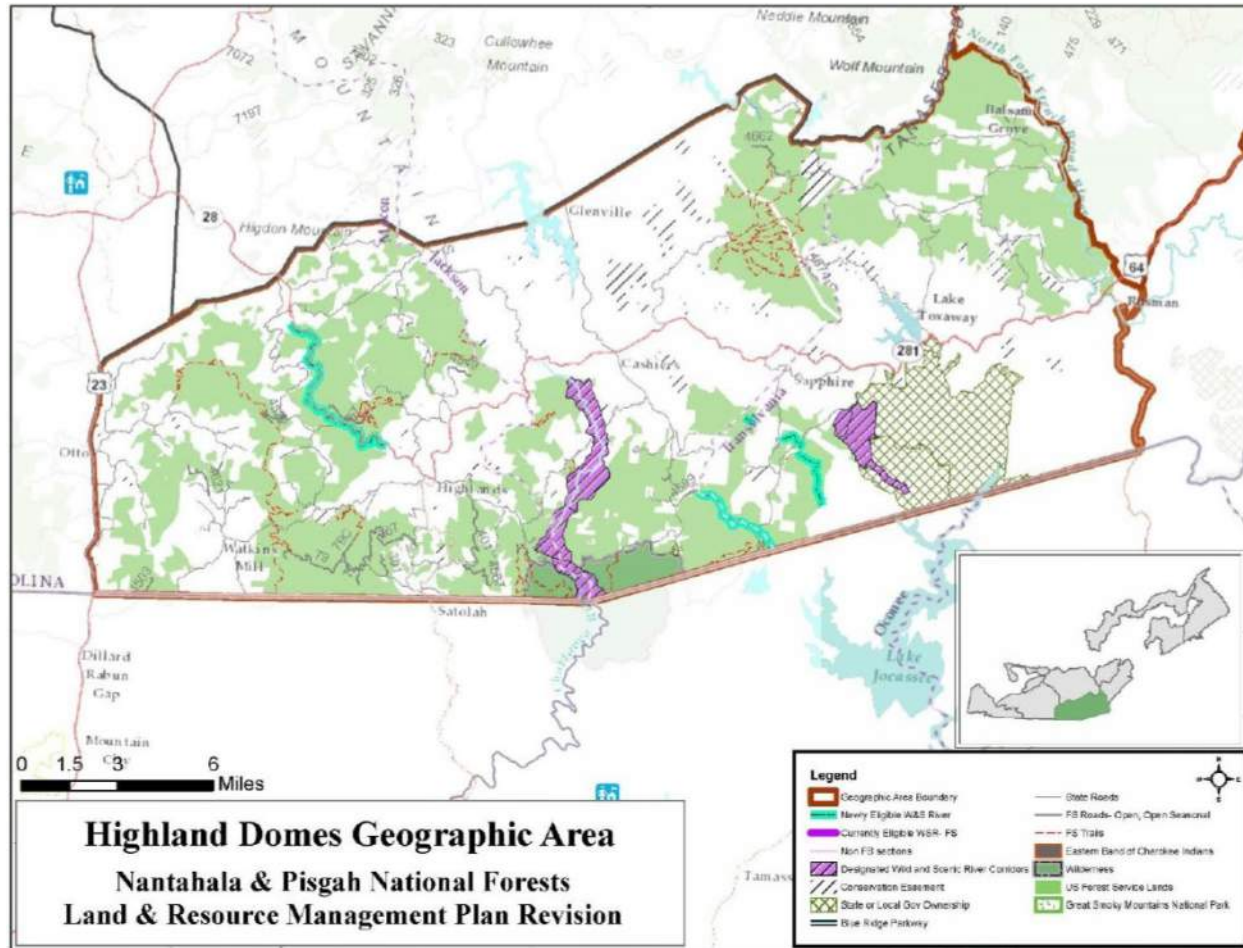
### **6.1.3 Existing Management Plans**

#### **6.1.3.1 Nantahala and Pisgah National Forests**

The Nantahala and Pisgah National Forests (Forests) are in western North Carolina. The Forests are managed under one plan<sup>9</sup>, though tracts remain designated as Nantahala or Pisgah National Forests (USFS 2023a). The Nantahala National Forest, totaling approximately 531,000 acres, is clustered in the southwest corner of the state, bordering South Carolina, Georgia, and Tennessee. The Pisgah National Forest, approximately 513,000 acres, has tracts near the South Carolina border and along the Tennessee border. No portion of the Pisgah National Forest adjoins the Project. The Forests are subdivided into geographic areas that share a distinctive landscape. The Highland Domes geographic area borders South Carolina, adjacent to Lake Jocassee and the Project (Figure 6-5).

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<sup>9</sup> Available online at <https://www.fs.usda.gov/main/nfsnc/landmanagement/planning>.

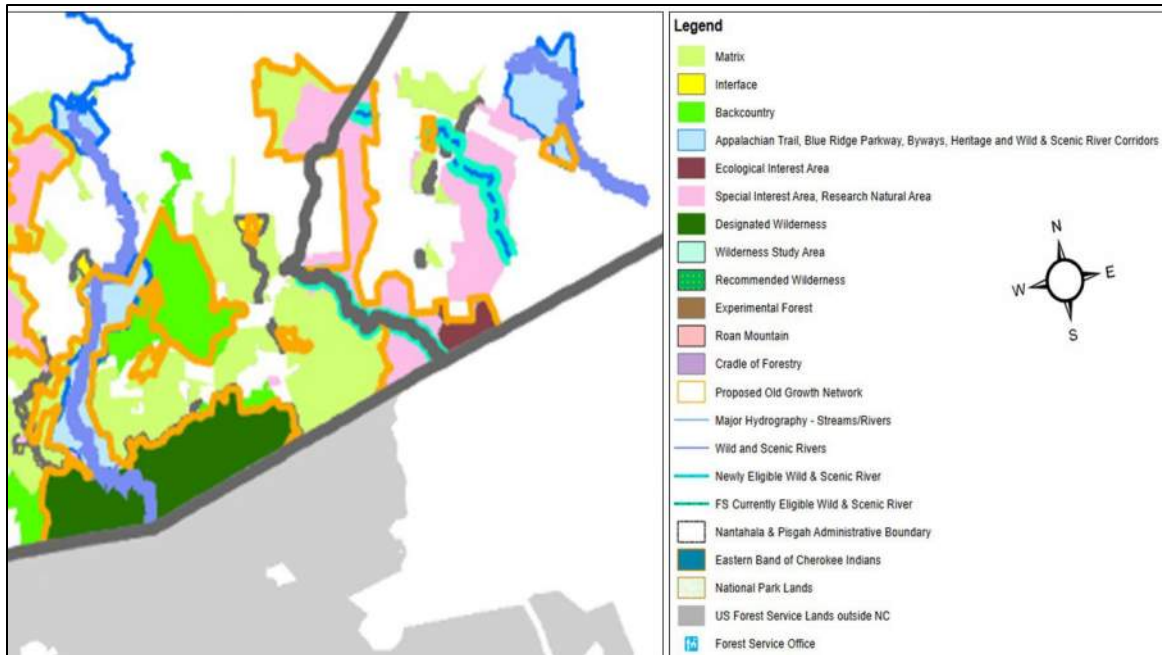


Source: Nantahala and Pisgah National Forests Land Management Plan (USFS 2023a)

**Figure 6-5. The Highland Domes Geographic Area of the Nantahala National Forest**

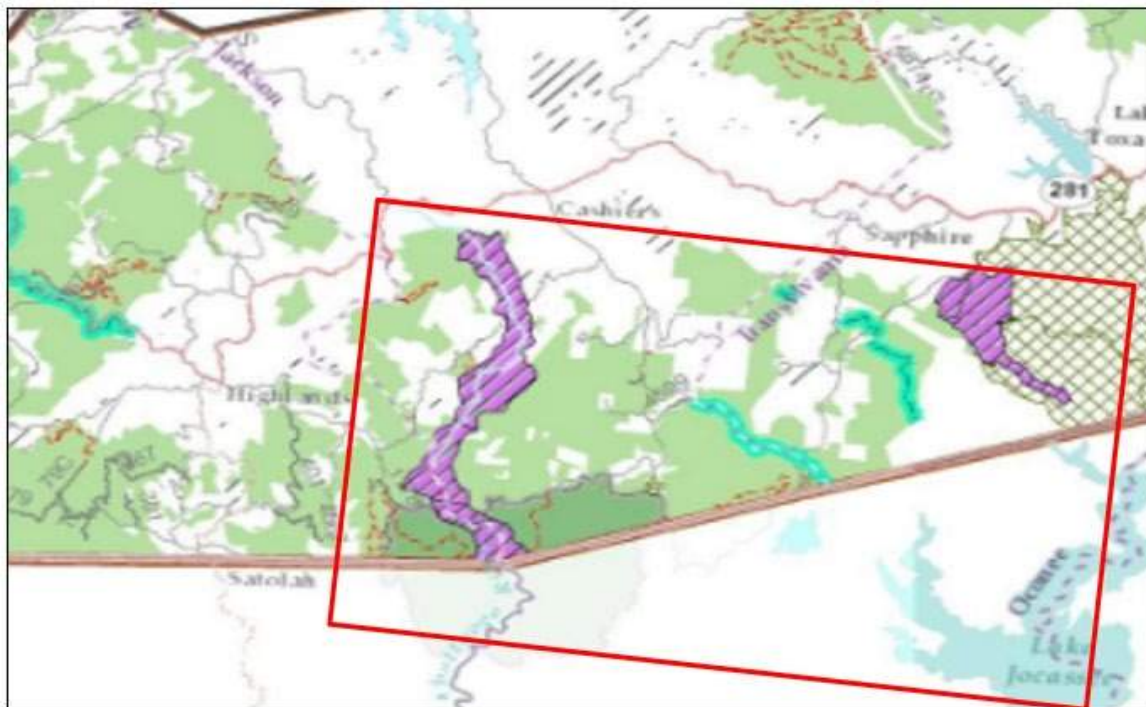
#### 6.1.3.1.1 Resource Management

The Nantahala and Pisgah National Forests Land Management Plan (USFS 2023a) defines and identifies management areas, areas with related characteristics that lead to defined patterns of development and resource management. Five management areas in the Nantahala National Forest are near the Project: Matrix, Ecological Interest Area, Special Interest Area, Designated Wilderness, and Newly Eligible Wild & Scenic River. A separate overlay identifies Proposed Old Growth Networks, which in this area of the Forests, includes the Ecological Interest and Special Interest areas around Whitewater River and the Ellicott Rock Wilderness Area (see Figure 6-6 and Figure 6-7). Following is a description of each type of management areas and key management standards that would affect viewsheds and viewshed development (USFS 2023a).



Source: USFS 2023a

**Figure 6-6. Management Areas of Nantahala and Pisgah National Forests adjacent to Project Area**



**Figure 6-7. Locator Map of the Management Areas shown on Figure 6-6**

- **Matrix:** Matrix designated areas include diverse vegetation, and are managed to meet the objectives of restoration, wildlife habitat, and sustainable flow of wood products. Desired scenic character in Matrix management areas is natural appearing or pastoral in semi-primitive motorized recreation settings, and rural forested, pastoral, or cultural/historic in roaded-natural or rural settings. The desired scenic integrity objective ranges from High to Low, depending on the inventoried scenic class. Timber production is allowed.
- **Ecological Interest Area:** These areas are managed to improve ecological species composition. The desired scenic character is natural evolving to natural-appearing in semi-primitive recreation settings, and rural forested, pastoral, or cultural/historic in roaded-natural settings. The desired scenic integrity objective ranges from high to low, depending on the scenic class. These areas are unsuitable for timber production, and timber harvest is allowed only to restore species composition.
- **Special Interest Area:** These areas are the most exceptional ecological communities that serve as core areas for conservation, and these areas are managed to support and enhance the communities and the scenic character of the area. The desired scenic integrity objective ranges from high to low, depending on the inventories scenic class. These areas are unsuitable for timber production, and timber harvest is allowed only to restore desired community composition.
- **Designated Wilderness:** Wilderness is managed to perpetuate or enhance the natural and undeveloped character of the area while providing opportunities for recreation. The desired scenic integrity objective is very high. The sites are managed with little to no human development, including roads or developed recreational or commercial features. These areas are unsuitable for timber production. Ellicott Rock Wilderness is the designated wilderness area within the study area. Ellicott Rock Wilderness is an 8,300-acre designated area encompassing three states, North Carolina, South Carolina, and Georgia. North Carolina contains the largest portion, 3,400 acres. For more information on Ellicott Rock Wilderness Area, refer to the Sumpter National Forest description below (Section 6.1.3.4).
- **Eligible Wild and Scenic River:** The Whitewater River is identified as having outstanding scenery, recreation, geology, and ecology/botanical value, and is

recommended for inclusion as a wild and scenic river from the North Carolina – South Carolina line upstream 3.6 miles (Figure 6-8). As an eligible wild and scenic river, as designated in the 2023 Nantahala and Pisgah National Forest Land Management Plan (USFS 2023a), it should be managed to maintain those elements. The desired scenic integrity objective is high. No management activities that may reduce the scenic resources of the river may be conducted within 0.25-mile on either side of the river segment. Silviculture can be performed as long as there is no substantial adverse effect.

Silviculture and timber production has been identified as a high priority in the current Management Plan, increasing annual timber production from 650 acres annually to 1,200 acres in the short term and 3,200 acres annually in the long term. Approximately 44% of the Forests are open to timber production, including steep slopes and backcountry areas, which would require new access roads. A timber sales plan has not yet been published but timbering activities may occur in the timeframe of the management plan (2023-2063) in those management areas that allow timber production.



**Figure 6-8. Wild and Scenic River Eligible Section of the Whitewater River in Nantahala National Forest with 0.25-mile buffer**

#### ***6.1.3.1.2 Summary of Potential Viewshed Effect***

The management of the Nantahala and Pisgah National Forests near the Project includes areas to be managed consistent with the current land cover condition and development and areas open to timber production, which would affect the viewshed. National Forests are protected from sale, so the Forests will remain as conservation open space into perpetuity. There are no Forest regulations that impose viewshed requirements on the surrounding area.

#### **6.1.3.2 Sumter National Forest**

Sumter National Forest consists of three non-contiguous ranger districts in South Carolina. The Andrew Pickens Ranger District is in the western edge of the state in Oconee County on more than 85,000 acres near the Project as shown on Figure 6-9.

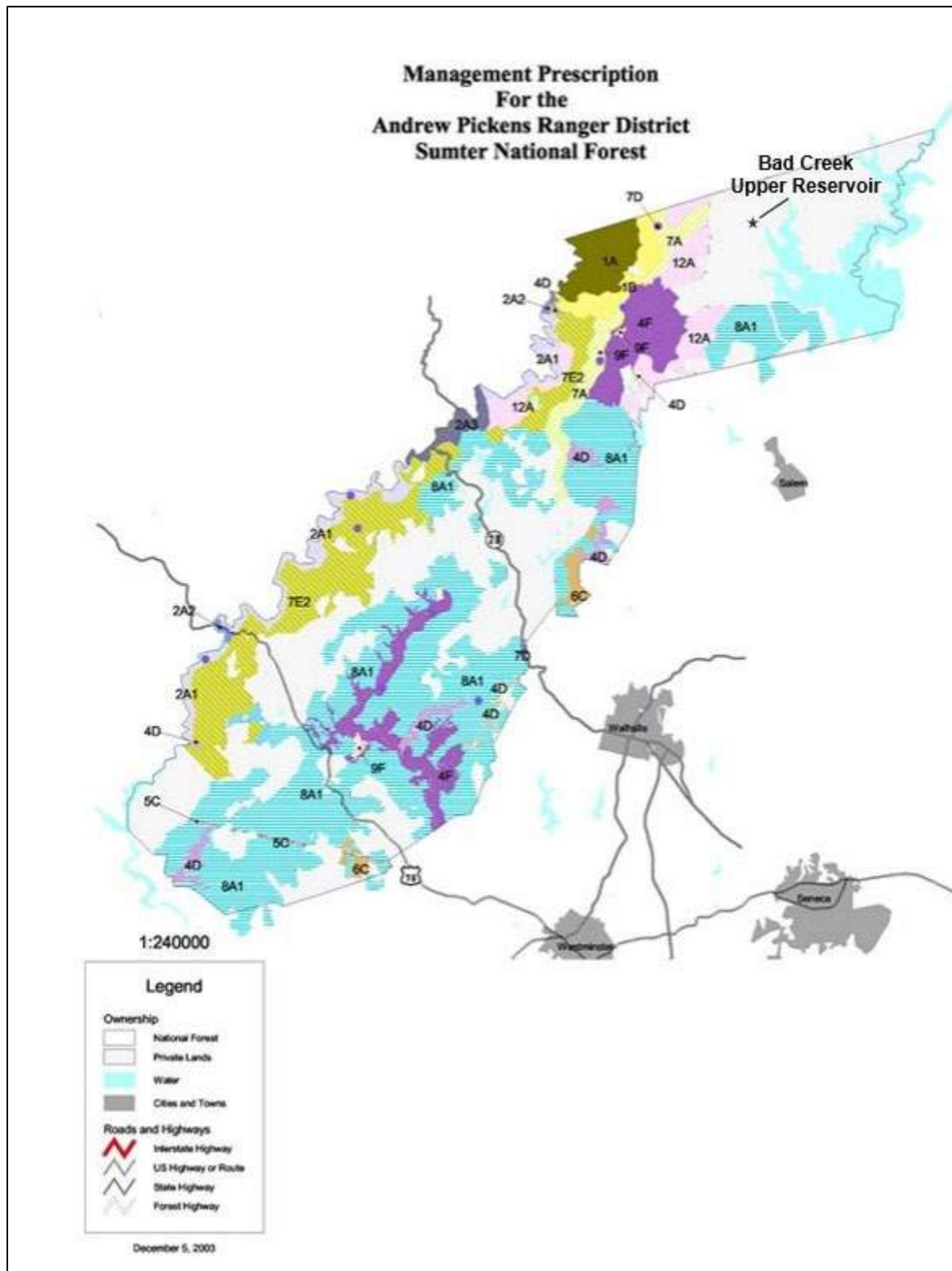


Image source: USFS 2004

## Figure 6-9. Management Strategy Areas of Sumter National Forest in Oconee County, South Carolina

### 6.1.3.2.1 Resource Management

The management of the district emphasizes habitat restoration and enhancement for a diverse range of wildlife and plant species, with emphasis on rare, threatened, endangered, and sensitive species. There were seven tracts of timber sales in the Andrew Pickens Ranger District in FY 2020-2022, but they were all in southern half of the district, and not near the Project area.

The Revised Land and Resource Management Plan Sumter National Forest (USFS 2004) identifies areas within the national forest for different management strategies<sup>10</sup>. The following is a summary of strategy areas near the Project and key management standards that would affect viewsheds and viewshed development.

- **1A – Designated Wilderness Area:** Very high scenic integrity objective, no new utility corridors or community sites, no mining leases permitted, unsuitable for timber production.
- **1B – Recommended Wilderness Study Area:** Very high scenic integrity objective, no new utility corridors or community sites, no mining leases permitted, unsuitable for timber production.
- **4F – Scenic Area:** Very high or high scenic integrity objective, no surface mining leases, unsuitable for timber production.
- **7A – Scenic Byway Corridor:** includes the area visible during leaf-off season for up to ½ mile from either side of the road, management is focused on outstanding scenery, high scenic integrity objective, no surface mining leases, unsuitable for timber production.
- **7D – Concentrated Recreation Zone:** variety of recreational development including high-density, high to moderate scenic integrity objective, no surface mining leases, unsuitable for timber production.

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<sup>10</sup> The Sumter Forest Land and Resource Management Plan is available online at <https://www.fs.usda.gov/detailfull/scnfs/landmanagement/planning/?cid=stelprdb5261413>.

- **8A1 – Mix of Successional Forest Habitats:** managed for mast production and habitat and vegetative diversity, high to low scenic integrity objective, mining leases are possible, suitable for timber production.
- **9F – Rare Communities:** Very high to moderate scenic integrity objective, no mining leases permitted, unsuitable for timber production.
- **12A – Remote Backcountry, Few Open Roads:** High scenic integrity objective, no surface mining leases, unsuitable for timber production.

### **Ellicott Rock Wilderness Area**

Ellicott Rock Wilderness is an 8,300-acre wilderness area west of the Project site. It spans three states and three forests: North Carolina (Nantahala National Forest), South Carolina (Sumter National Forest), and Georgia (Chattahoochee National Forest) (Figure 6-10). Approximately 2,855 acres of the wilderness are within Sumter National Forest in South Carolina. The Ellicott Rock Wilderness Area is designated 1A on the Andrew Pickens Ranger District management prescription map (USFS 2023c).

Federally designated wilderness areas have different management goals than other federally managed lands, that are more restrictive of human impact. The intent for a wilderness area is to be protected and managed to maintain a “wilderness character” free of permanent improvements and the sights and sounds of modern human occupation. Commercial activities, including timber harvesting, motorized access, roads, structures, and facilities are prohibited in wilderness areas.

The management standards for Ellicott Rock Wilderness in Sumter National Forest include that the scenic integrity objective is very high for all inventoried scenic classes, no new utility corridors or communication sites will be authorized, no new roads shall be built, and the lands are unsuitable for timber production.

The Sumter National Forest Management Plan identifies a 1,982-acre area directly east of Ellicott Rock Wilderness as a recommended wilderness study area. (Designated as area 1B on the management prescription map). This area is managed to protect wilderness characteristics pending legislation as to their characteristics.

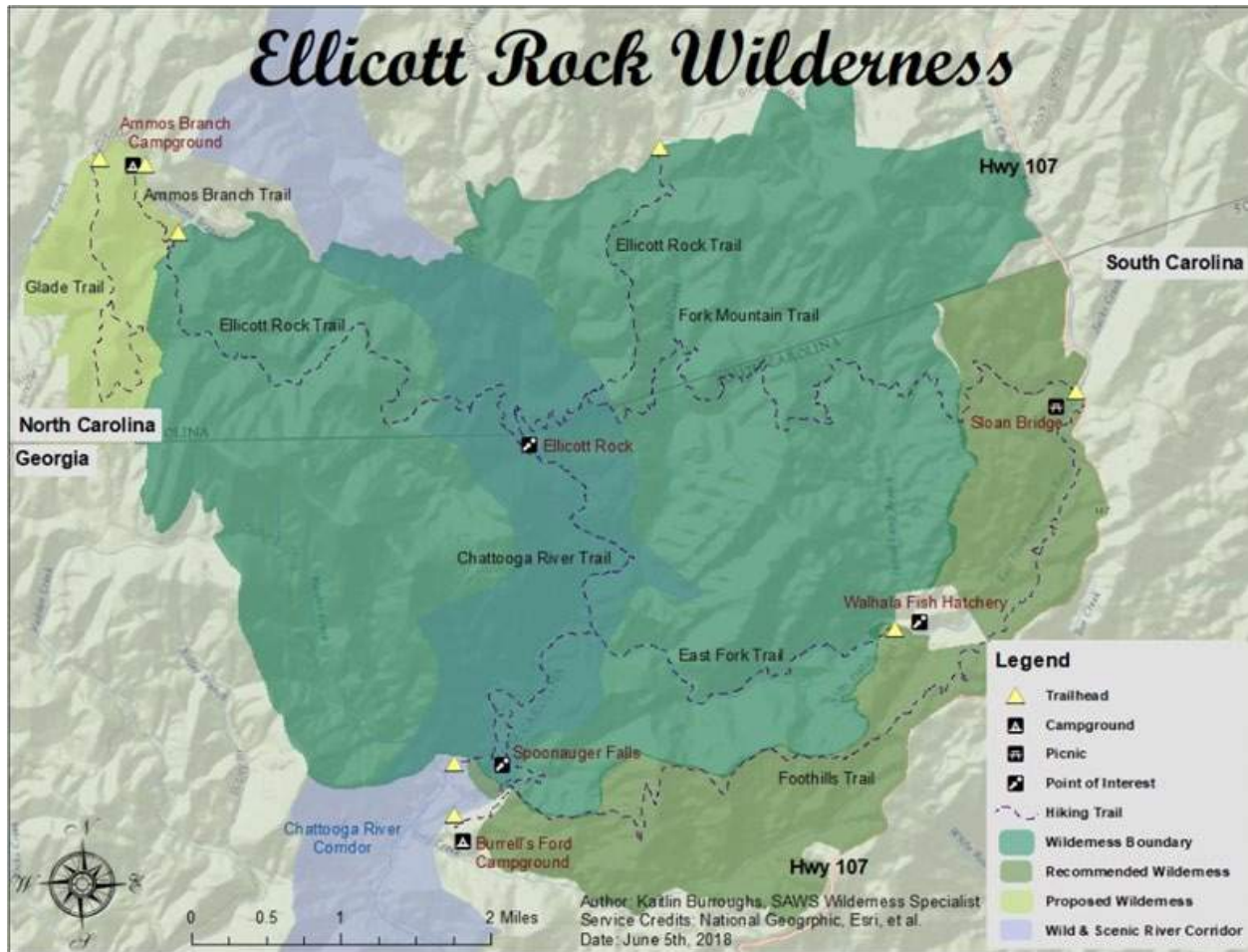


Image source: USFS

**Figure 6-10. Map of Ellicott Rock Wilderness Area in North Carolina, South Carolina, and Georgia**

#### 6.1.3.2.2 Summary of Potential Viewshed Effect

The management of the Sumter National Forest near the Project area by and large protects the viewshed in its current condition, by limiting timber production, surface mining operations, or intensive development. One section of the National Forest adjacent to Devils Fork State Park and bisected by the Duke Energy utility corridor is managed for timber production. This area may be logged at some point, affecting the views in the area. However, this management strategy is in alignment with widening of the primary transmission line corridor as would be needed for Bad Creek II, offsetting potential effects of the widening project. National Forests are protected from sale, so Sumter National Forest will remain as conservation open space in perpetuity. There are no regulations of the Forest that impose viewshed requirements on the surrounding area.

### **6.1.3.3 Jim Timmerman Natural Resources Area at Jocassee Gorges**

The Jim Timmerman Natural Jocassee Gorges Natural Area (Jocassee Gorges) is approximately 43,500 acres in size and is a series of properties east and north of Lake Jocassee in South Carolina (Figure 6-11). The land is primarily managed as a Wildlife Management Area by SCDNR. SCDNR owns most of this land and activities are governed by a management plan and regulations developed, in large part, in response to public input. Duke Energy, the former owner of much of the Jocassee Gorges, has retained ownership of some of the lands, but has granted a conservation easement to SCDNR. Public access to the Duke Energy lands is allowed.

#### **6.1.3.3.1 Resource Management**

“A Resource Management Plan for the Jocassee Gorges Property” was prepared by SCDNR in 1998 (SCDNR 1998)<sup>11</sup>. The plan identifies the most important consideration in the management of Jocassee Gorges is to maintain the natural character of the area. The secondary objective is to provide public recreation compatible with the area's natural character. Recreational activities provided for in the plan include hunting, fishing, hiking, and horseback riding. The management plan also recognizes that Jocassee Gorges provides tremendous opportunity for scientific study and education.

The size of this tract and its position among other public properties with substantial stands of hardwood and pine-hardwood forest contribute to its significant scenic and recreational attributes. A forest management plan has been developed for the property, with the purpose of improving wildlife and plant habitat and diversity. Some areas of the site may be considered for timber harvest, related to enhancement of habitat, biodiversity, and forest health, but timber harvest will not be relied upon as a major funding source. Managed burns are also part of the forest management plan.

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<sup>11</sup> The plan is available online at <https://www.dnr.sc.gov/land/publications/jocplan.html>.



Image source: SCDNR 1998.

**Figure 6-11. Map of Jocassee Gorges with visitor attractions**

#### **6.1.3.3.2 Summary of Potential Viewshed Effect**

Jocassee Gorges is being managed as a natural scenic area, preserving the existing forest habitat and views into perpetuity. Though there may be small development or forest management activities that would affect the view of or within the property, those activities would have minimal effect on the near- and long-term views. There are many trails, overlooks, and camping opportunities within the site, drawing visitors from the state and the larger region to the Lake Jocassee region. There are no regulations of Jocassee Gorges that impose viewshed requirements on the surrounding area.

#### **6.1.3.4 Oconee County Comprehensive Plan**

Oconee County's 2020 Comprehensive Plan (Oconee County 2020; Comprehensive Plan) was developed to guide growth and development decisions<sup>12</sup>. It lays out guiding principles for coordinated long-term planning around all aspects of the development of unincorporated areas in

<sup>12</sup> Oconee County's Comprehensive Plan and associated documents are available online at <https://oconeesc.com/planning-and-zoning-home/comprehensive-plan>.

Oconee County including the Project site. The current Comprehensive Plan was approved on March 3, 2020. It establishes guidelines for a ten-year period with a state-required update at five years. The Comprehensive Plan includes the following components:

- Goals, objectives, and strategies
- Future use land map
- Implementation Plan

#### ***6.1.3.4.1 Resource Management***

The Comprehensive Plan lays forth guiding principles related to all aspects of future development of Oconee County. Topics include transportation, education, housing, economic development, tourism, land use planning, recreation, natural resource protection, and viewshed protection.

Specific guidance related to visual resources are addressed in the Natural Resources Element of the Comprehensive Plan. Goals, objectives, and strategies related specifically to the protection of visual resources include are identified in Goal 6.2. (Preserve, protect, and enhance Oconee County's land resources):

- **Objective 6.2.1. Promote partnerships and voluntary conservation easements to preserve significant lands, habitats, and scenic areas under development pressure.**
  - Strategy 6.2.1.1. Support existing land conservation organizations in their efforts to preserve and protect rural lands, sensitive areas, and significant natural resources and transfer of development rights and conservation easements to protect rural lands, sensitive areas, and significant natural resources.
  - Strategy 6.2.1.2. Provide appropriate assistance from County departments and agencies in efforts to identify and preserve significant lands, and scenic areas.
- **Objective 6.2.2. Manage natural assets to ensure natural resources enhance the quality of life for residents and visitors and increase economic opportunities.**
  - Strategy 6.2.2.1. Protect and preserve natural resources for recreational use and develop new opportunities for recreational access.
  - Strategy 6.2.2.2. Work with public conservation partners to identify additional significant natural resources including viewsheds and habitats that warrant protection.
- **Objective 6.2.4. Continue to promote reasonable access to Oconee County's public natural amenities for residents and visitors.**

- Strategy 6.2.4.1. Encourage compatible land use adjacent to National and State Forests, wildlife management area, and County, State and municipal parks to protect such lands from incompatible uses.
- Strategy 6.2.4.3. Encourage and support efforts by public and private organizations to provide public access when conserving open space, natural areas and scenic vistas in Oconee County.

Comprehensive Plan objectives are supported by the Oconee County Zoning Ordinance which addresses visual resources through the Lake Overlay District, lighting requirements for commercial and industrial facilities, and development restrictions based on Existing and Future Land Use Classifications as summarized further below. However, as set forth in Section 38-9.5 (4), *“Notwithstanding any other provision herein to the contrary, proposed utility generation facilities and structures needed by regional and local utility providers in the production, transmission, and distribution of electricity, natural gas, water, or sewer services, as well as any facility or structure necessary to comply with any federal or state license requirements, related to such production, transmission, and distribution, shall be permitted by right in any district and shall be exempt from any standard set forth in this chapter”* (Oconee County 2024).

### **Lake Overlay District**

Oconee County created the Lake Overlay District as an amendment to the Zoning Ordinance in 2012 to, among other purposes, maintain natural beauty and ensure the enjoyment of Lake Jocassee and Lake Keowee by residents. The Lake Overlay District established a natural vegetative buffer of 25 ft as measured from the Lake Jocassee full pond elevation (1,110 ft msl). Within the buffer, no trees larger than six-inch caliber can be removed unless certified to be a hazard, and new manicured lawns or managed spaces cannot be established. No development activity or soil disturbance can occur in buffer areas, with buffer protection required during construction or development. The preservation of existing natural vegetation is encouraged.

### **Existing Land Use and Future Land Use Maps**

The Existing Land Use and Future Land Use Maps must be viewed together to understand their application to allowable activities. When developing the Comprehensive Plan, Oconee County inventoried and mapped existing land uses. The Project site was classified as Utility and Agricultural/Forest use in the Existing Land Use Map (Figure 6-11). Utility lands are used by electricity, natural gas, water, sewer, and communications providers. The Project site was

classified as Rural/Agricultural in the Future Land Use Map (Figure 6-12) which allows for a mix of uses so long as new uses do not negatively impact existing land uses.

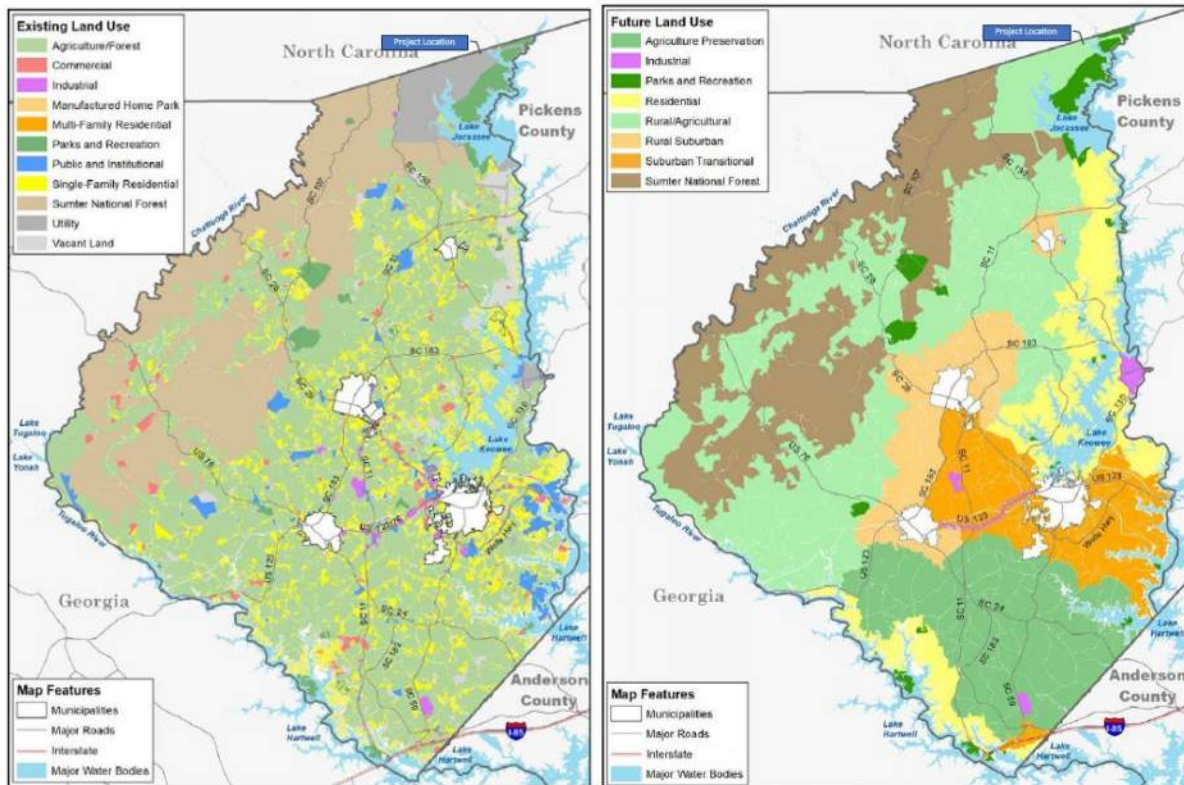


Image source: Oconee County 2020

**Figure 6-12. Existing (left) and Future (right) Land Use Classification Maps**

## Lighting Standards

Oconee County’s lighting standards are set forth in the Oconee County Code of Ordinances Chapter 38, Appendix A. The purpose of the Lighting Standards is to, “assure that adequate exterior lighting is provided to facilitate crime prevention, security, and safe passage, and that exterior lights be shielded to reduce the impact of lighting on neighboring uses, potential safety hazards to the traveling public, and the effect on viewsheds and nightscapes.” Consistent with this purpose, the County requires project developers to obtain approval of lighting plans for projects that include the installation of outdoor lighting fixtures. Lighting plans must include the location, type, and height of luminaries including both building and ground-mounted fixtures; and, a description of the luminaries, including lamps, poles or other supports and shielding devices including the angle of light emission. Exterior lighting must be shielded to avoid illuminating the night sky. On-site lighting may be used to provide safety and security on

pedestrian walkways, at building entrances, areas between buildings, and in parking areas. Blinking and flashing lights are prohibited unless the lights are required as a safety feature (Oconee County 2024).

#### ***6.1.3.4.2 Summary of Potential Viewshed Effect***

The Comprehensive Plan recognizes that the Project is an area with high scenic quality and that efforts should be made to ensure Bad Creek II Project features are compatible with existing land uses and protect scenic vistas to the extent practicable. The Project is consistent with both Existing Land Use and future Land Use Classifications. Bad Creek II is exempt from the requirements for the Lake Overlay District and Lighting Standards established in Chapter 38 of the Oconee County Code of Ordinances. In summary, the regulations in the Oconee County Comprehensive Plan impose restrictions on the area that protect the viewshed in day and night conditions, but these requirements do not apply to the existing Project or Bad Creek II.

#### **6.1.3.5 KT Shoreline Management Plan**

Duke Energy's KT Shoreline Management Plan (SMP) is a comprehensive management tool for managing requests from lake neighbors for shoreline activities within the KT Project Boundary at Lake Keowee and Lake Jocassee in a manner consistent with KT Project purposes. The SMP identifies the types of activities that are allowed along the shoreline based on Shoreline Classification and includes Shoreline Management Guidelines (SMG) establishing the requirements for lake neighbors seeking approval for such activities. The KT SMP was initially developed by Duke Energy in the mid-1980s and most recently updated during the relicensing of the KT Project (Duke Energy 2014).

##### ***6.1.3.5.1 Resource Management***

The KT SMP includes two categories of shoreline classifications: environmental classifications and existing and future use classifications. SMP Shoreline Classifications at Lake Jocassee, their definitions, and allowable shoreline uses are summarized below. Notably, the KT SMP limits residential development to only a few shoreline areas at Lake Jocassee; marinas and other intensive types of shoreline uses are not allowed. The remaining shoreline classifications allow for public recreation, public infrastructure, and hydroelectric project operations.

- Environmental Classifications

- Environmental Areas: Undeveloped, vegetated areas or cove heads with a stream confluence. While many wildlife species use Environmental areas, the primary importance of these areas is to provide spawning, rearing, and nursery habitat for fish and rearing, nursery, and adult habitat for amphibians, reptiles, and birds. No vegetation removal, construction, excavation, or shoreline stabilization is permitted.
- Integrated Management Zones: Undeveloped Project lands and waters important from a scenic, environmental, or cultural standpoint, but the protection of these important values does not necessarily preclude Project or non-Project construction and use; development impacts are avoided or minimized and may require mitigation measures.
- Natural Areas, Natural Isolated Berm: Areas with characteristics that make most development undesirable, such as shallow water, isolated berms, significant cultural resources or significant terrestrial habitat areas; no vegetation removal, construction, or excavation is permitted.
- Existing and Future Use Classifications
  - Integrated Management Zones Developed: Developed Project lands and waters important from a scenic, environmental, or cultural standpoint, but the protection of these important values does not preclude Project or non-Project construction and use; future development impacts are avoided or minimized and may require mitigation measures.
  - Project Operations: Project lands and waters associated with hydroelectric power production including but not limited to dams, dikes, powerhouses, and other hydroelectric plant properties. At Lake Jocassee, this includes shoreline associated with both the Project as well as Jocassee Pumped Storage Station.
  - Public Infrastructure: Existing non-recreational public facilities (e.g., utility line corridors) that support regional needs.
  - Public Recreation (existing and future): Existing or future facilities supporting various public recreational amenities including Project Access Areas and state,

district, county, and city parks and public recreation lands adjoining the Project Boundary.

- Residential (existing and future): Existing or future private facilities for Project-front landowners, none of which can be multi-family dwellings, including, among other things, piers, boathouses, boat shelters, boat docks, floats, and existing boat ramps for individual residences.

In addition to shoreline classifications, the KT SMP restricts adjacent landowners from most vegetation management activities within the FERC Project Boundary. This will limit the effect of future residential development activities on the shoreline buffer at Lake Jocassee.

#### ***6.1.3.5.2 Summary of Potential Viewshed Effect***

Allowable shoreline uses at Lake Jocassee are limited with only a few areas of the lake available for additional residential development. In addition, any such additional development will be limited with respect to ability to remove shoreline buffer vegetation. This will ensure a continued shoreline buffer around Lake Jocassee further limiting the potential views of Bad Creek II from residence.

The construction of Bad Creek II will not affect the SMP or its implementation. The shoreline adjoining the existing Project facilities as well as the proposed Bad Creek II facilities is classified as Project Operations under the SMP (Figure 6-13). Construction of the lower reservoir inlet/outlet structure is consistent with the Project Operations shoreline classification.

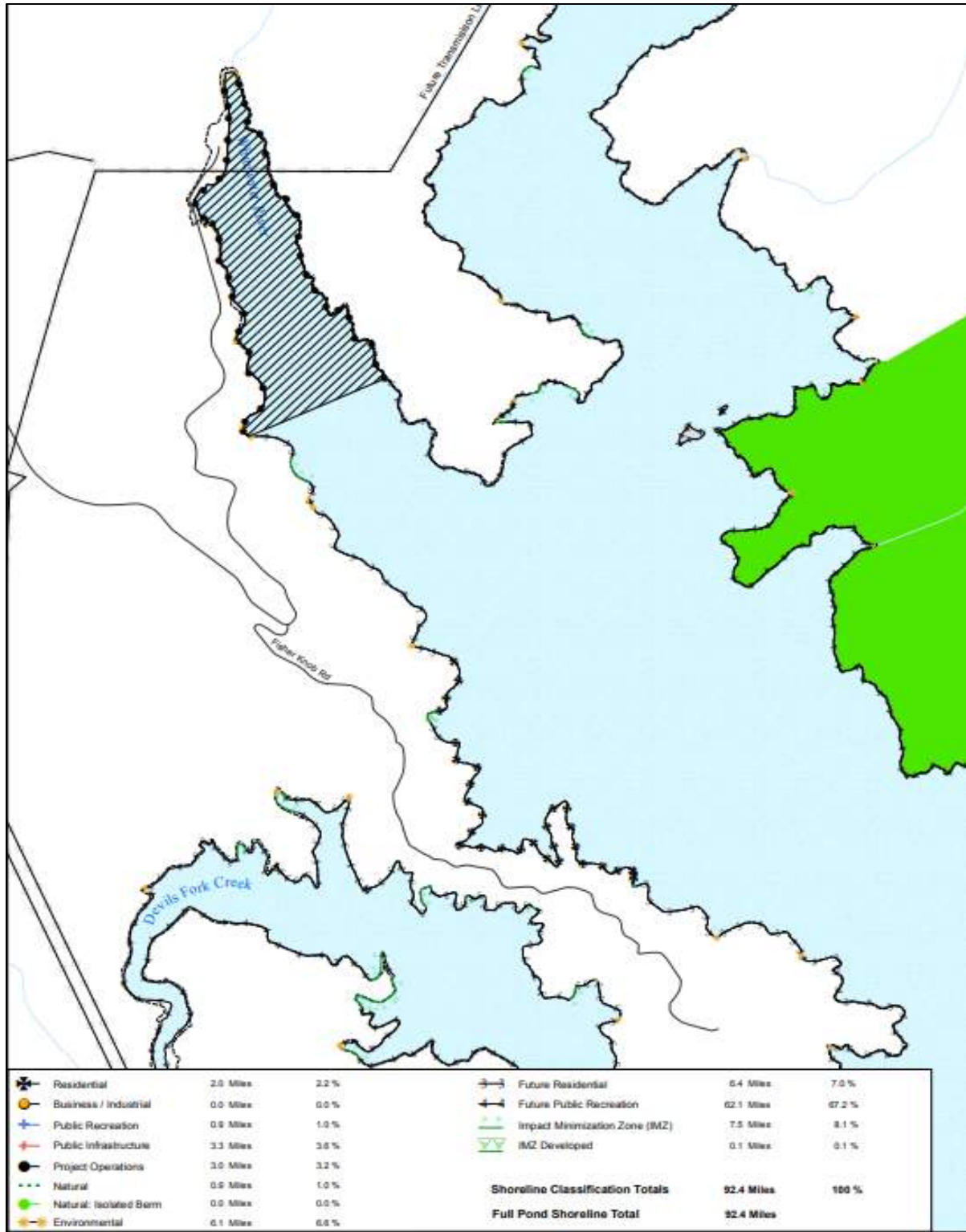


Image source: Duke Energy 2014. Jocassee Development Sheet 2 of 3.

**Figure 6-13. KT SMP Shoreline Classification Map for Project Area**

## **6.1.4 Existing Landscape Patterns**

### **6.1.4.1 Form**

The region is characterized by informal naturalistic forms of meandering lines and organic edges of the mountain ridges and lake shore edges. There are geometric forms associated with the Project, with rectangular buildings, straight lines of fences and building pads, 90-degree corners, consistent slopes and trapezoidal forms of fill slopes for spoils, pads, and dams.

### **6.1.4.2 Line**

The predominant lines in the landscape are irregular, organic horizontal lines of the mountainous horizon, layered ridges and valleys, and forested lake shore. The Project introduces straight lines into the landscape, with vertical buildings and regularly-sloped dams and spoil areas. The cleared primary transmission corridor is a straight line in contrast to the meandering and organic ridgelines of the surrounding landscape.

### **6.1.4.3 Color**

The primary color palette of the area is earth-toned, with shades of medium to dark green of the forest in the spring and summer, and shades of yellow, orange, and brown in the fall and winter. The sky and reflection in the reservoirs add strong areas of blue to the landscape.

The Project features are primarily light colors, with white buildings and pale stone dam embankments and service areas. Cleared grassy areas associated with the Project are a light green, which contrasts with the darker green of the surrounding forest. The primary transmission line corridor creates a color contrast of lighter colored grasses/shrubs in the corridor compared with the surrounding darker forests that it passes through.

### **6.1.4.4 Texture**

There is a fine texture to the areas of grass and shrubs in the cleared areas around the Project and the transmission line corridor. Project buildings and transmission towers have a smooth texture, with potential for reflectivity. The forest in the area, which is the predominant matrix of the area, has a medium texture. The reservoir and lake have a smooth and reflective texture.

### **6.1.4.5 Pattern**

The landscape is largely characterized by contiguous mixed pine-hardwood forested mountains, with limited human development along the western and southern Lake Jocassee shoreline, and to

the south of Lake Jocassee. The development along the lake shore is visually insignificant, in scope, size, and scale of the buildings and development. The Project and the primary transmission line corridor are anomalies in the context of the overall landscape pattern.

### **6.1.5 Summary of Existing Landscape Description**

The Project is located in the mountainous region of Upstate South Carolina, an area known and marketed as a wilderness recreation destination. This area is part of the Blue Ridge Escarpment, or the “Blue Wall”, which is the tectonic divide between the Blue Ridge Mountains and the rolling hills of the Piedmont. This geology has created dramatic ridges, waterfalls, and long views. Lake Jocassee, numerous streams and waterfalls, including the highest waterfall east of the Rockies, hiking trails, fishing opportunities, and scenic roads and overlooks draw people from across the region to this area. Most of the area surrounding the Project site are protected wilderness recreation areas, including Sumter, Nantahala, and Pisgah National Forests, Jocassee Gorges, and Devils Fork State Park. Contiguous mixed pine-hardwood forests cover much of the region, with limited human development visible. The area has very high scenic value as a mountain wilderness and is aesthetically appealing.

## **6.2 Task 2 – Seen Area Analysis**

The Seen Area Analysis results are shown on Figure 6-14 through Figure 6-25. As shown in these figures, views of Bad Creek II features are greatly affected by the topography of the area. The expanded (i.e., widened) primary transmission line would have the greatest visibility of Bad Creek II features while views of the lower reservoir inlet/outlet structure would be restricted to the smallest area.





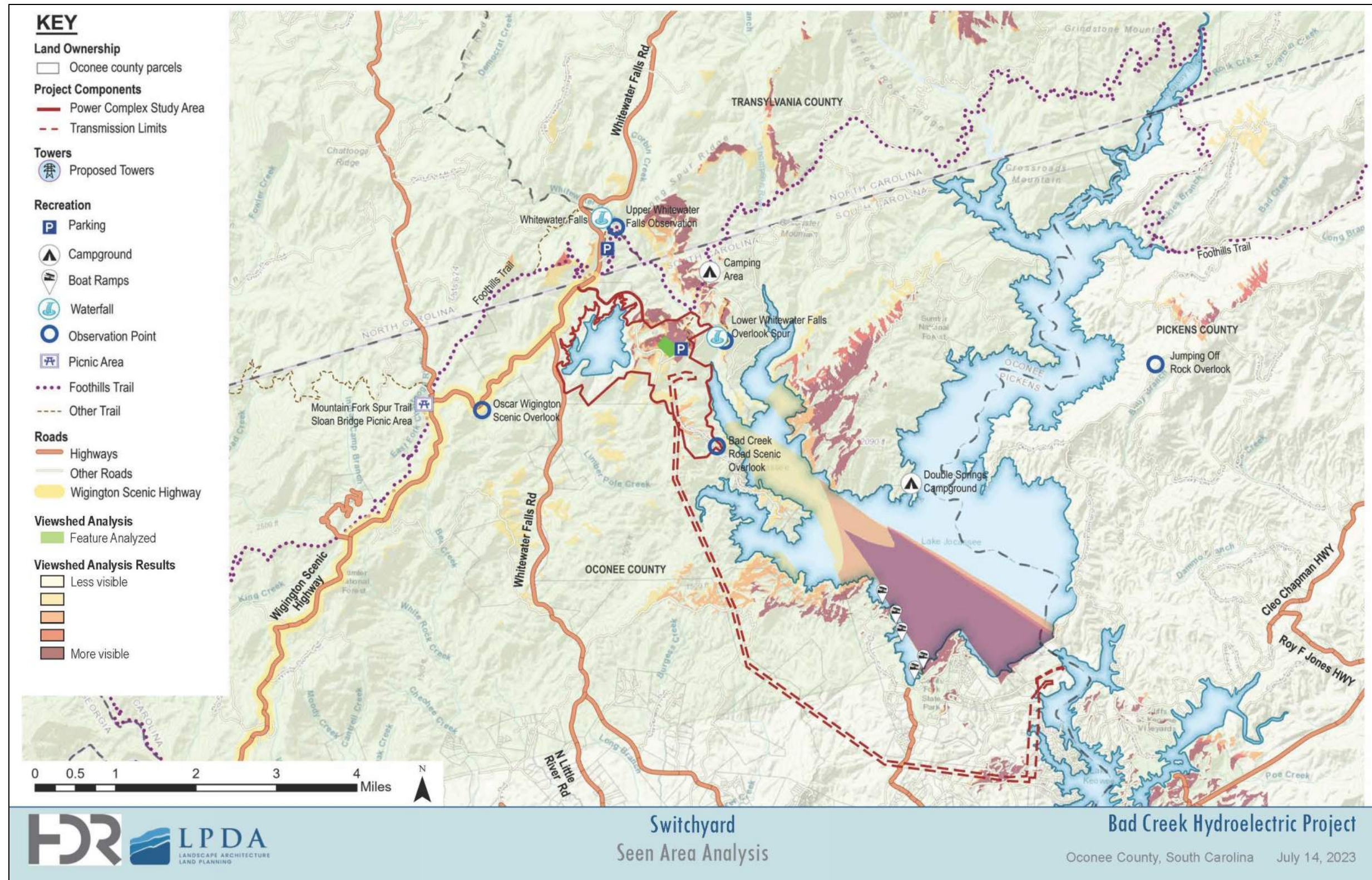


Figure 6-16. Proposed Switchyard Seen Area Analysis

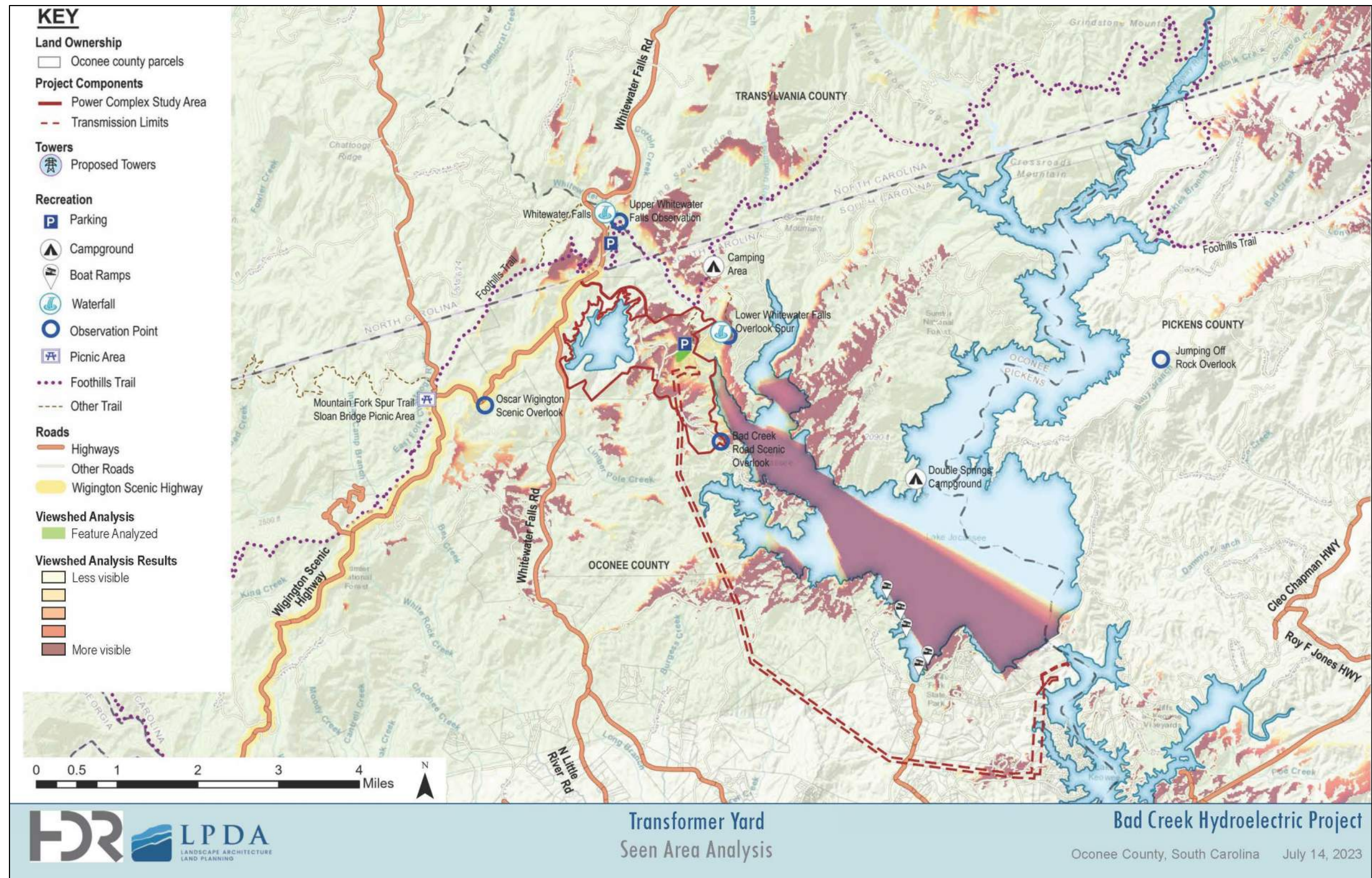


Figure 6-17. Proposed Transformer Yard Seen Area Analysis





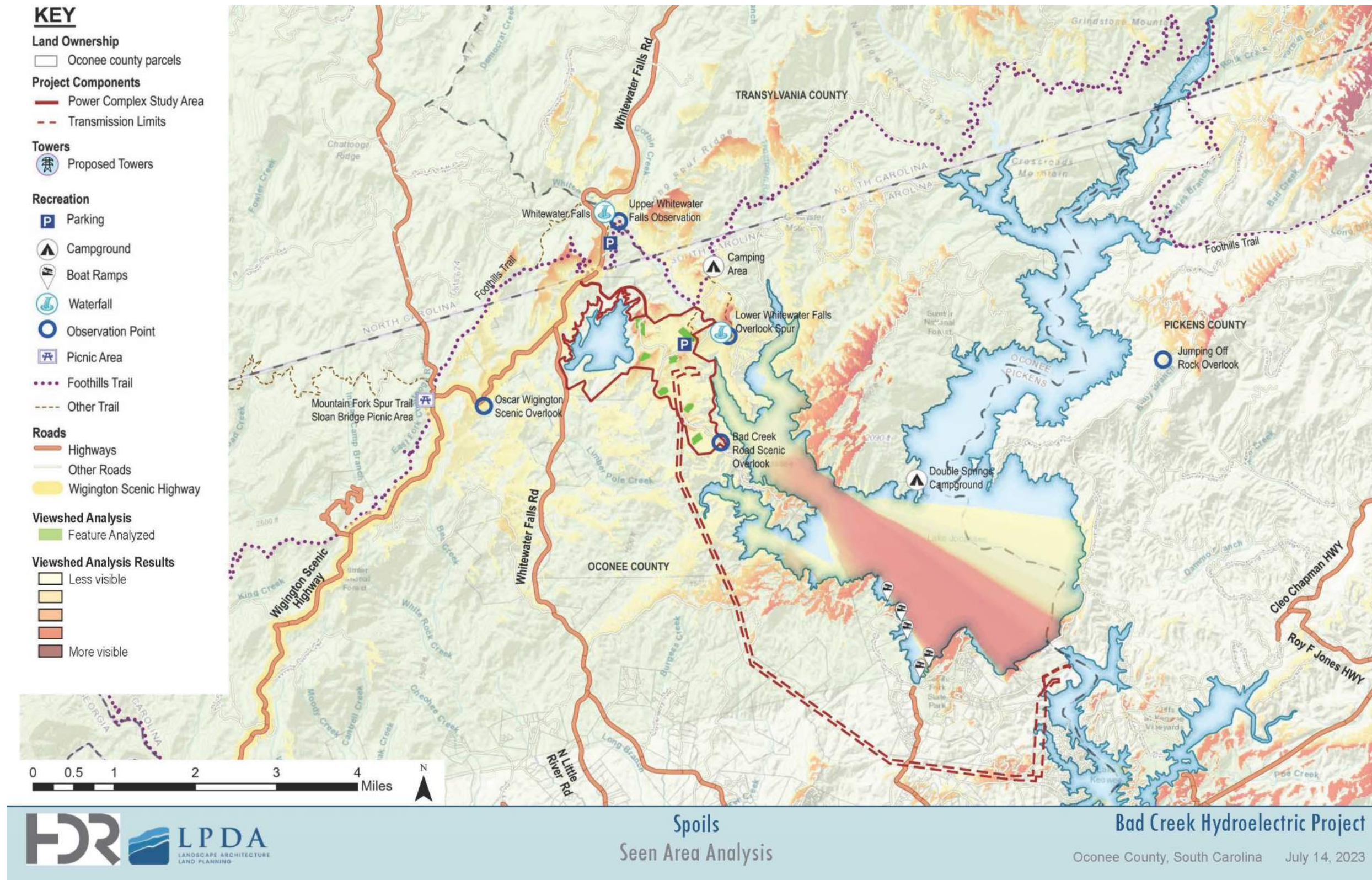


Figure 6-20. Proposed Spoil Areas Seen Area Analysis





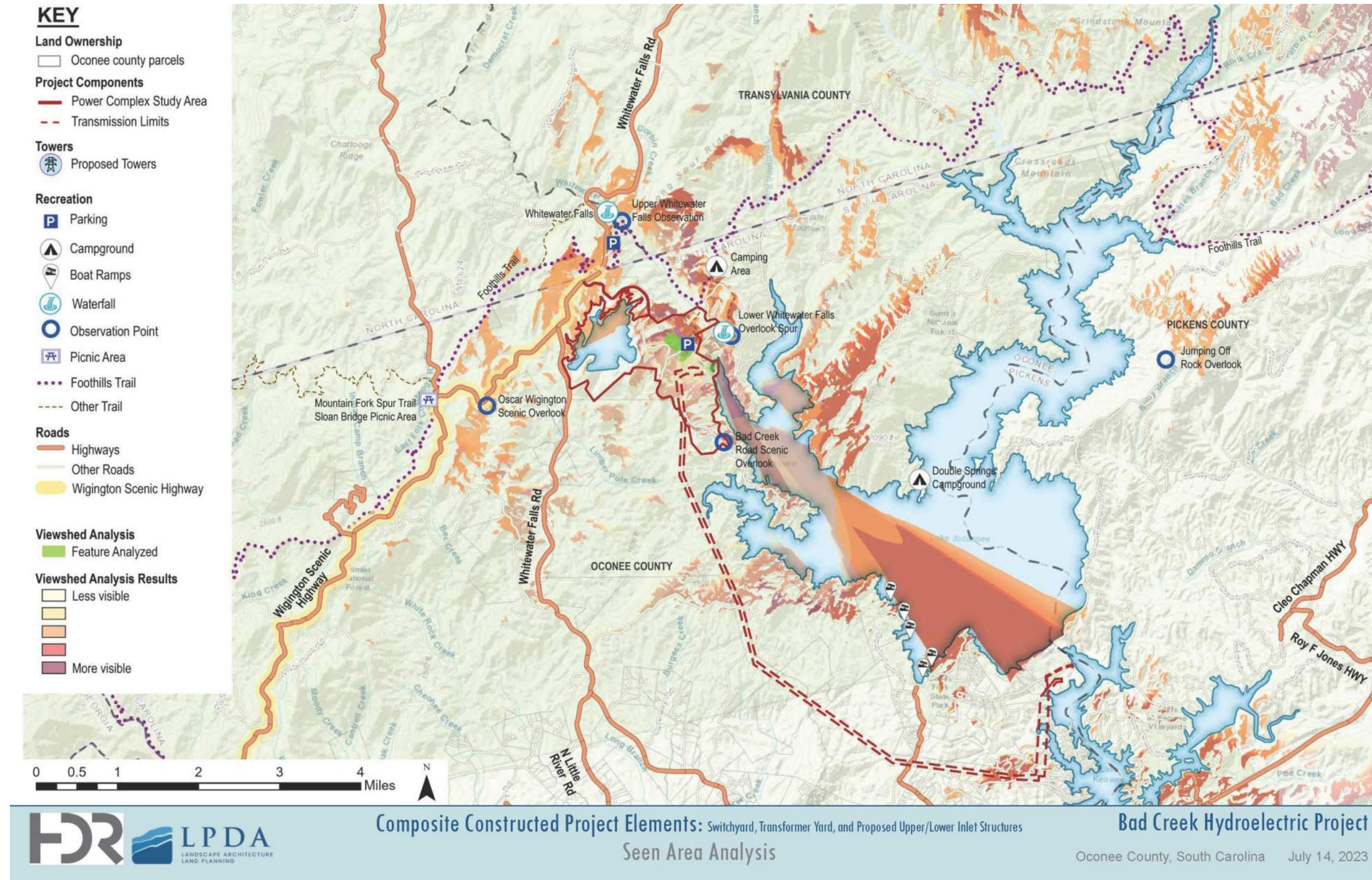


Figure 6-23. Composite Constructed Proposed Project Elements Seen Area Analysis



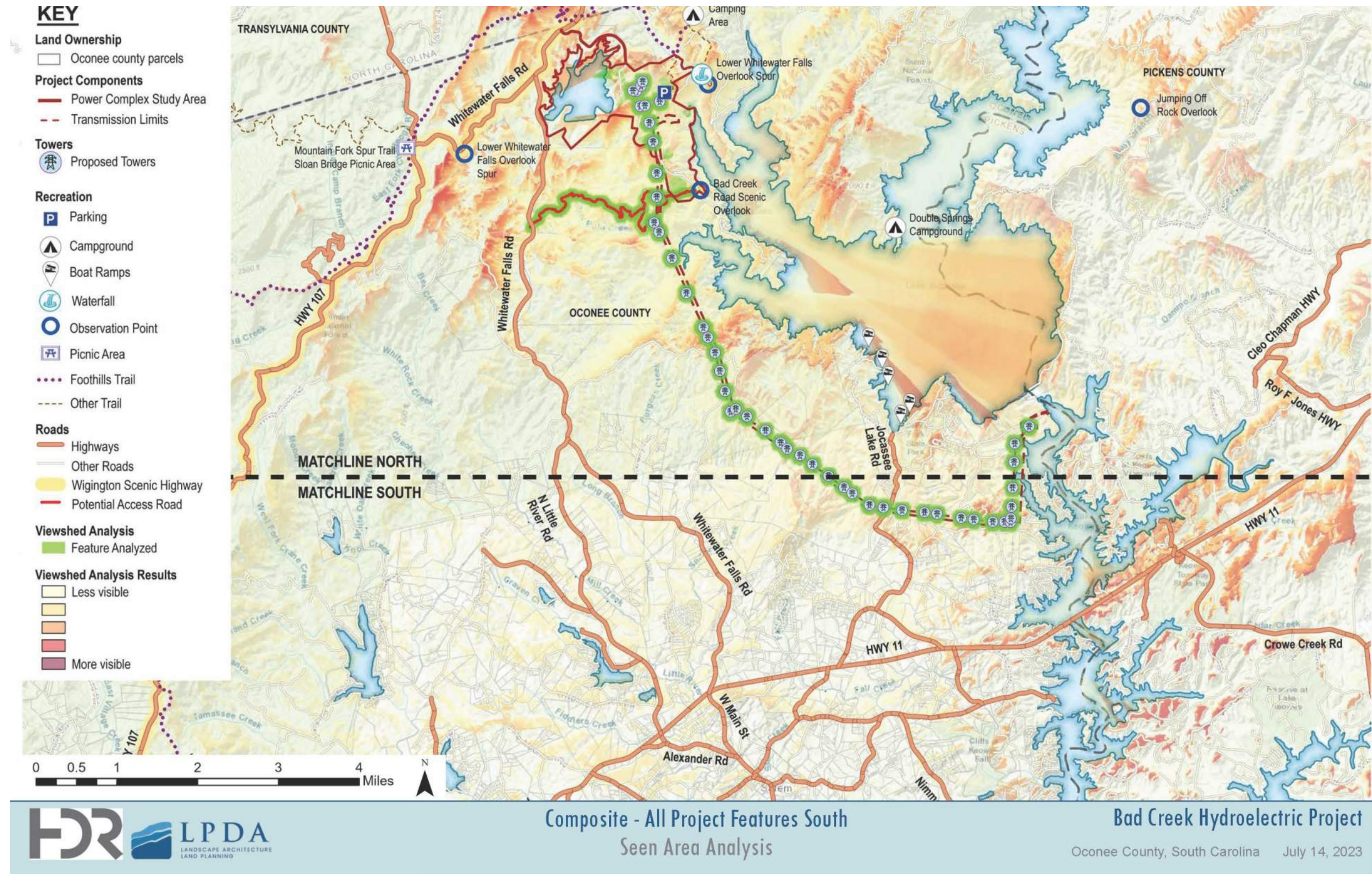


Figure 6-25. Composite – All Proposed Project Features (South) Seen Area Analysis

## 6.3 Tasks 3 & 4 – Field Investigation and Key Views Selection

The RC selected six potential Key Views (out of the original 11 proposed) for field investigation as shown in Table 6-1 and Figure 6-25. During the evaluation of the views, the RC reviewed the seen area analysis results, accessibility of potential Key Views to the public, and prior visualization work associated with initial project planning.

The RC elected to use the existing visualization of the lower reservoir intake/outlet area (Key View 3) as viewed from the Whitewater River cove that was developed during initial project planning instead of re-creating it (i.e., duplicating the effort). While this visualization was not done during leaf-off conditions, views of the structure are unobstructed given there is very little vegetation between the structures and the lake. Duke Energy agreed to include an analysis of the visual effects along with the additional four visualizations to be developed for this study.

On October 11, 2023<sup>13</sup>, Duke Energy provided the RC with its proposal to capture nighttime views of the existing Project to use in evaluating potential lighting effects resulting from Bad Creek II operations (lighting evaluations are for normal future Project operations, not construction). The proposal identified four potential locations as shown on Figure 6-27.

The field crew collected photos on December 6, 2023. Daytime views were collected by a three-person crew between 10:00 am and 1:30 pm; night views were collected between 6:00 pm and 9:30 pm. Weather conditions were good for photography with clear conditions during both sessions. Both 24 millimeter (mm) and 50 mm images were collected for all views.

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<sup>13</sup> See email in Appendix A.

**Table 6-1. Potential Key Views**

| Potential View | Description of location  | Approximate coordinates (lat/long) | Direction of View | Elevation (ft msl) | Potential Key View <sup>1</sup> |
|----------------|--|------------------------------------|-------------------|--------------------|---------------------------------|
| 1A             | Bad Creek Foothills Trail parking lot  | 35.0121490°N<br>82.9994901°W       | West              | 1929               | No                              |
| 1B             | Bad Creek Foothills Trail parking lot  | 35.0121490°N<br>82.9994901°W       | Southwest         | 1929               | No                              |
| 2              | Lower Whitewater Falls Overlook  | 35.0137962°N<br>82.9900206°W       | West              | 1760               | Yes                             |
| 3              | Whitewater River cove entrance (from water)  | 35.0026097°N<br>82.9905286°W       | North             | 1108               | Yes <sup>2</sup>                |
| 4              | Bad Creek Road Scenic Overlook   | 34.9947366°N<br>82.9912529°W       | Northwest         | 1639               | Yes                             |
| 5              | Bad Creek Road Scenic Overlook   | 34.9947366°N<br>82.9912529°W       | Southwest         | 1639               | Yes                             |
| 6              | Devils Fork State Park main boat ramps   | 34.9534575°N<br>82.9466694°W       | Northwest         | 1108               | No                              |
| 7              | Oscar Wigington Scenic Overlook  | 35.0010028°N<br>83.0434883°W       | East              | 2836               | Yes                             |
| 8              | Devils Fork State Park boat ramp   | 34.9632126°N<br>82.9506040°W       | Northwest         | 1108               | No                              |
| 9              | Bad Creek spur trail to Foothills Trail (top of first hill from parking lot) looking towards office complex. | 35.0152084°N<br>82.9980709°W       | West              | 1990               | Yes                             |
| 10             | Fisher Knob neighborhood   | 34.9887026°N<br>82.9815273°W       | Northwest         | 1138               | Yes                             |

Notes: <sup>1</sup>Potential Key View selected by the RC at its July 2023 meeting for field investigation; <sup>2</sup>Visualization completed during project planning.

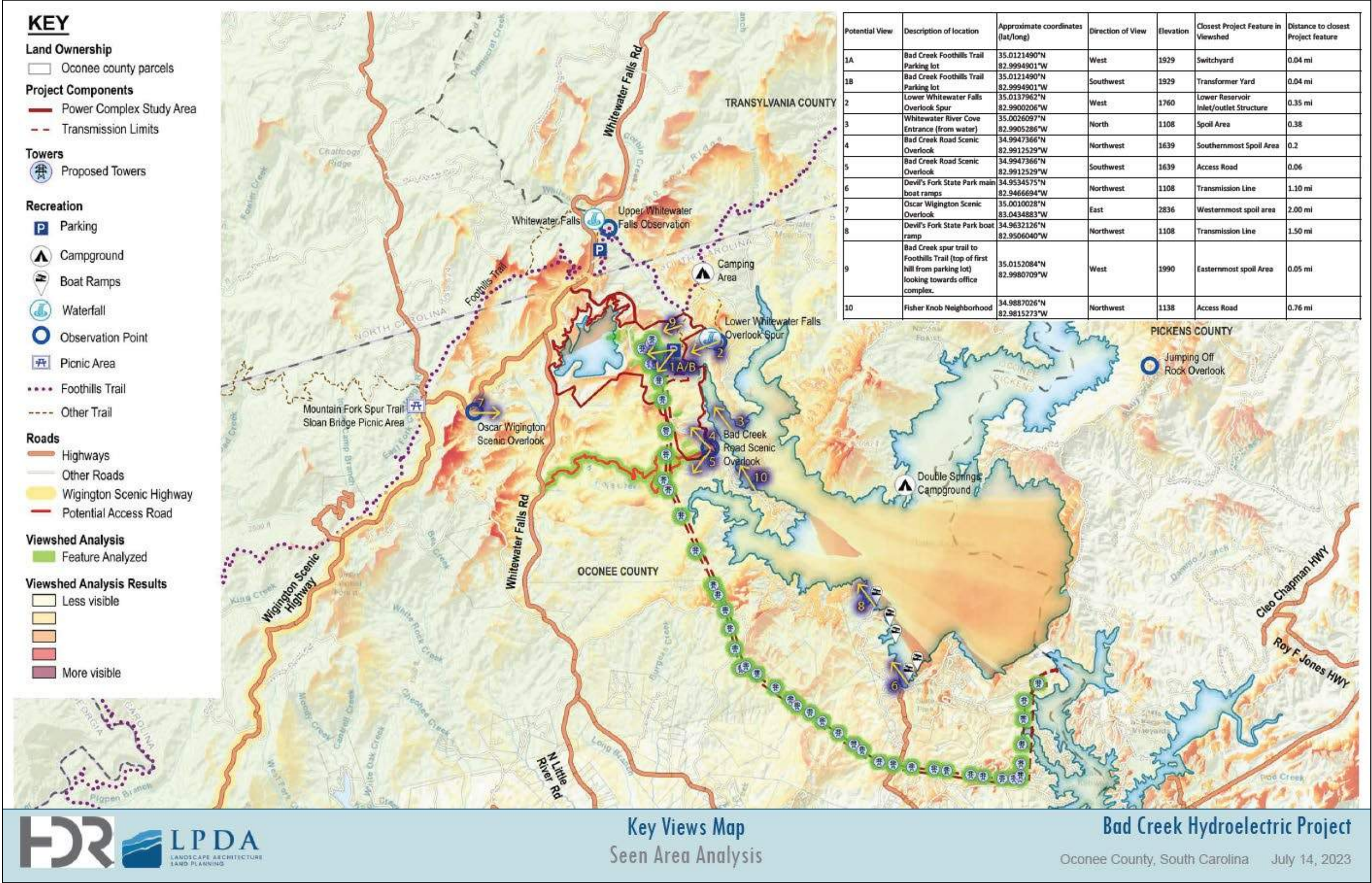


Figure 6-26. Potential Daytime Key Views

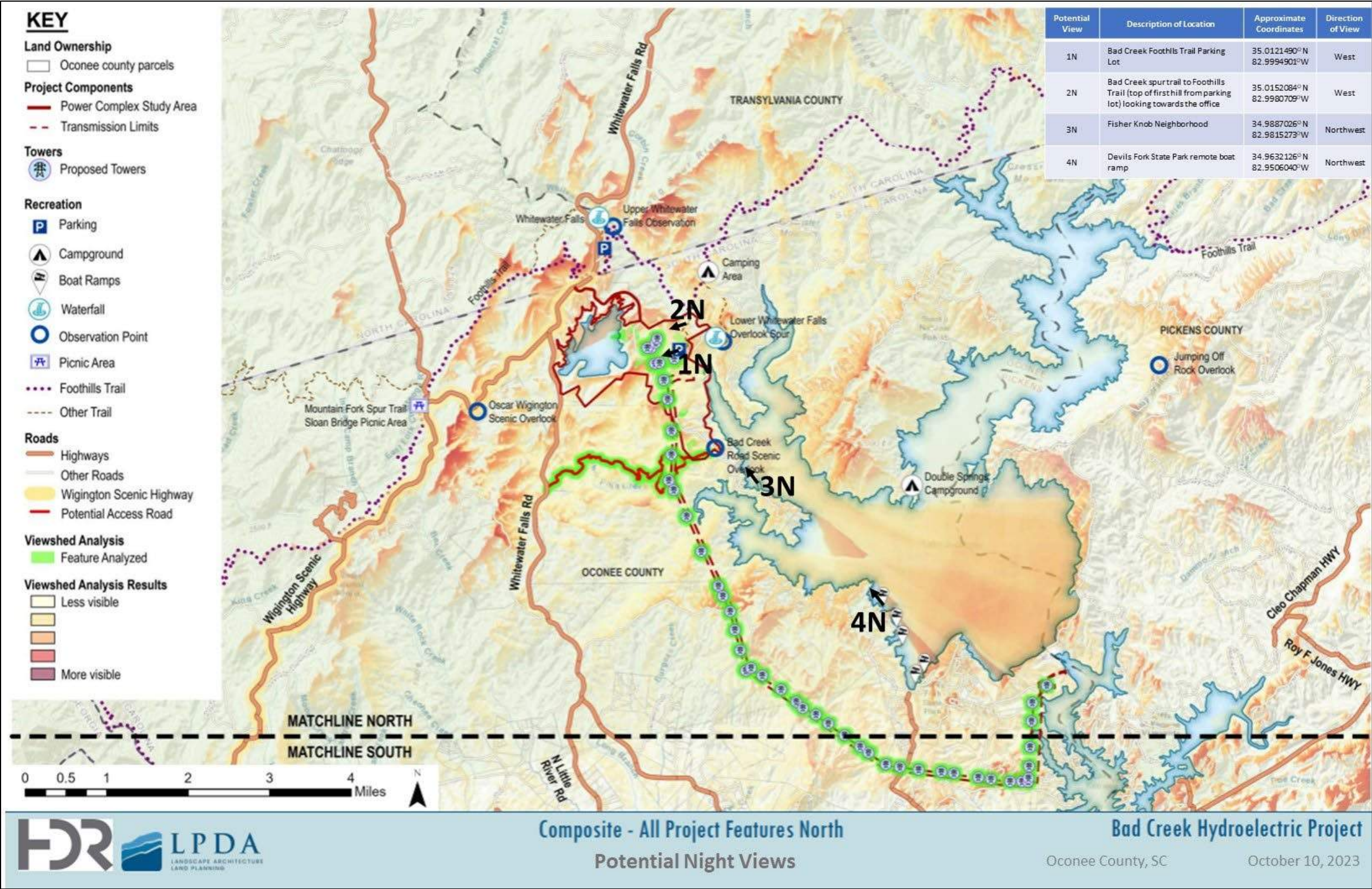


Figure 6-27. Potential Night Views

The field crew made decisions to adjust view locations based on field conditions (i.e., vegetation and accessibility) and the visibility of existing and potential Bad Creek II features. Changes to the daytime view locations are as follows:

- View 5 Bad Creek Road Scenic Overlook (southwest): Views from the overlook towards the southwest were heavily dominated by vegetation. Other than a glimpse of the primary transmission line, no Project features were visible. Given the Bad Creek II primary transmission line would be adjacent to the existing line, the field crew eliminated this view.
- View 9 Bad Creek spur trail to the Foothills Trail: The spur trail is heavily screened from the site by vegetation even during leaf-off conditions. Given the limited visibility, the team evaluated shifting to the trailhead at the parking lot and the information kiosk at Musterground Road; the field crew substituted a view from the Musterground Road entrance. Because this potential view would be dominated by the transformer yard and switchyard in the foreground, only a 24-mm image was collected.
- View 10 Fisher Knob: The field crew obtained photos from two locations on Fisher Knob. One location, View 10a, is the closest existing private dock at the lake. The other location, View 10b, is farther south on a prominent point.

The field crew made the following changes to the night view locations:

- View 2N Bad Creek spur trail to the Foothills Trail: This view was eliminated based on the team's experience earlier in the day and the limited use of the trail during dark conditions.
- View 3N Fisher Knob: The crew obtained photos from the same two locations at Fisher Knob used for the daytime views. These are designated as 3N(a) and 3N(b).
- View 4N Remote Day Use Boat Ramp at Devils Fork State Park: No light was apparent from the existing Bad Creek site even without moonlight. The crew then visited Jocassee Dam to evaluate if the higher elevation would provide a view of light from the site; no such light was visible. and photos were not collected at either location.

As described in Section 5.4, the RC met on January 11, 2024, to review the photos and select those to use with the remaining study tasks. After discussion, the RC elected to proceed with the following Key Views:

- Key View 2: Lower Whitewater Falls Observation Platform
- Key View 3: Lower Reservoir Inlet/Outlet Portal from Lake Jocassee
- Key View 4: Bad Creek Visitor Overlook (Northwest)
- Key View 7: Oscar Wigington Scenic Overlook
- Key View 10b: Fisher Knob Point

The RC elected to use Night Views 1N<sup>14</sup> and 3Nb for the lighting assessment. Photos of Key Views are included in Appendix.

## 6.4 Tasks 5 & 6 – Existing Visual Quality Assessment and Visual Analysis

### 6.4.1 Key View 2 – Lower Whitewater Falls Observation Platform

The Lower Whitewater Falls Observation Platform (Observation Platform) is accessed from a Foothills Trail spur trail (Figure 6-28). It was developed to provide safe viewing of the Lower Whitewater Falls which is north of the lower intake/outlet portal on Lake Jocassee. Vegetation between the Observation Platform and the falls is actively managed to facilitate viewing of the falls, but no such vegetation management is currently occurring to facilitate views of Project features.

The seen area analysis results presented in Section 6.2 identified the following features as visible from the Observation Platform: upper reservoir inlet/outlet portal, lower reservoir inlet/outlet portal, spoil areas, and transmission towers. However, because of the dense vegetation present, even during leaf-off conditions, the only existing Project features that are visible from the Observation Platform are existing transformer yard structures, transmission lines and towers

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<sup>14</sup> Design changes after the fieldwork was completed shifted the location of the Bad Creek II transformer yard such that Site 1N will be within the transformer yard. Therefore, this site was eliminated from use for additional lighting visualizations.

associated with the existing transformer yard, and the excavated wall behind the existing lower reservoir inlet/outlet portal. This demonstrates the role the heavily vegetated nature of the surrounding landscape plays in limiting views of existing Project features and proposed Bad Creek II features.

#### **6.4.1.1 Existing Conditions**

At this Key View (2), the overall scenic class rating is 4 (moderate value). The colors are generally dark greens, browns, and grays, during leaf-off conditions. Dominant lines and textures are organic with vertical lines in the immediate foreground and foreground, defined by the trees. and the effect of adjacent scenery is minimal.

The dominant view is of the immediate foreground/foreground due to the dense evergreen and deciduous vegetation, even in the leaf-off condition. The middle ground is indistinguishable due to the slope of the land between the foreground and the background. The background is visible in the leaf-off condition and would likely be obscured in the leaf-on condition. During leaf-off periods, the horizon line is attractive due to the gentle slope of the ridge and the contrast with the sky. The horizontal ridgeline is prominent. Cultural modifications include three transmission towers, transmission lines, and exposed rock areas adjacent to the outlet structure. The horizontal lines of the transmission wires mimic that of the ridgeline and are only moderately visible during the leaf-off condition. The existing outlet structure and portions of three transmission towers in the background are visible under leaf-off conditions. The outlet structure reads as a light tan patch in the surrounding landscape. The lines of the transmission tower are similar to the lines of the vegetation in this view, but the light metal color stands out against the dark background vegetation.

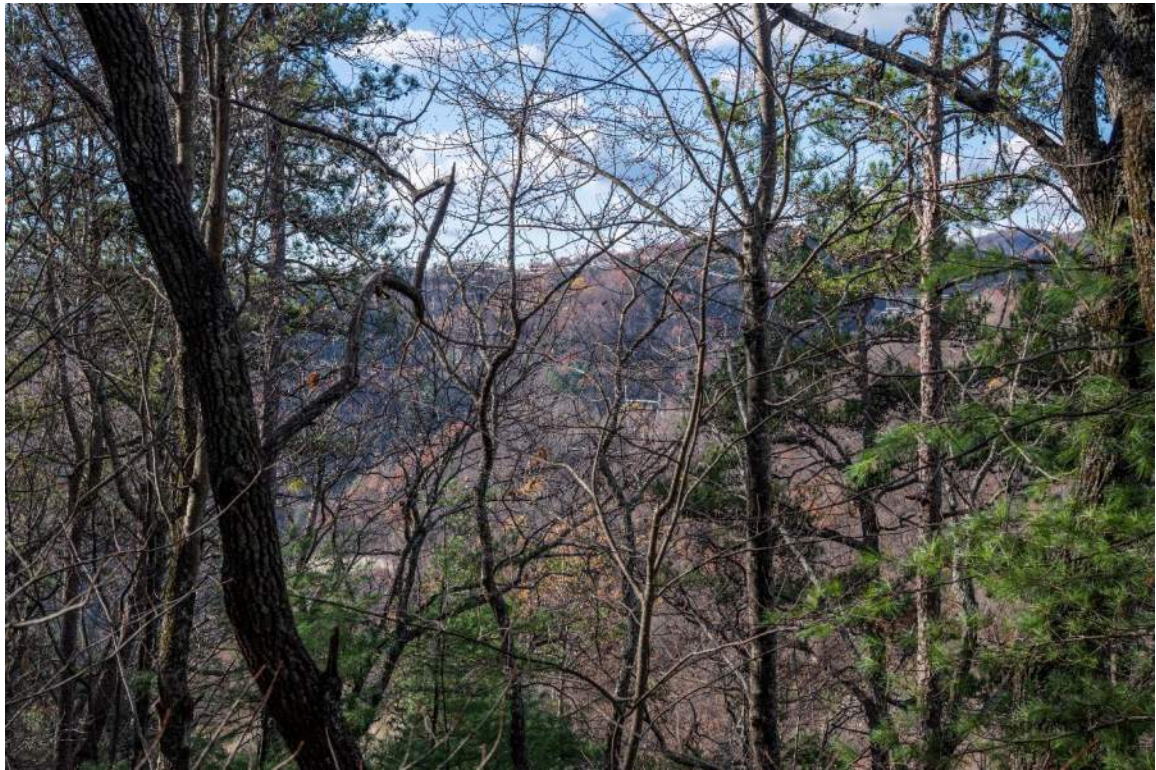
The overall Scenic Integrity Objective of this view is high. The noticeable deviations (the lower reservoir inlet/outlet structure and transmission towers and lines) are not visually dominant at this scale during leaf-off conditions and are anticipated to not be visible during the leaf-on condition due to dense foliage in the immediate foreground/foreground.

#### **6.4.1.2 Proposed Conditions**

The proposed conditions view includes additional transmission lines and a portion of the excavated hillside that would be located upland of the lower reservoir inlet/outlet structure portal.

The additional transmission lines are slightly more visible than the existing lines. While still mimicking the horizontal lines of the ridgeline, the pale metal lines now draw attention to the transmission structures below the ridgeline, accentuating the presence of the utilities within the landscape.

The excavated hillside is visible in the leaf off condition but is not visually obtrusive. The hillside appears as a tan patch in the lower portion of the view and does not significantly alter the scenic quality.



**Figure 6-28. Key View 2: Lower Whitewater Falls Observation Platform (Top-existing Conditions; Bottom-proposed conditions)**

## **6.4.2 Key View 3 – Lower Reservoir Inlet/Outlet Portal from Whitewater River cove of Lake Jocassee**

Key View 3 provides a view of the lower reservoir inlet/outlet portal while boating on Lake Jocassee (Figure 6-29).<sup>15</sup> Unlike the other Key Views, Key View 3 was developed during initial project planning depicting leaf-on conditions. However, because the primary Bad Creek II facilities within the view are along the shoreline, vegetation does not obscure Project features.

### **6.4.2.1 Existing Conditions**

At this Key View (3), the overall scenic class rating is 5 (moderate to low value). The colors are blues and grays, greens, tans and browns, in leaf-on conditions. Dominant lines are sloping and organic, defined by the steeply sloping hills, rockfaces, and reflections in the water. Textures range from smooth in the watery foreground to soft in the middle ground wooded hillside. The structures provide a contrasting sharp texture. The effect of adjacent scenery is non-existent due to the confined nature of this view.

The dominant view is of the foreground, the structures and hillside on the edge of the lake. The immediate foreground consists of calm lake water and one buoy. At the edge of the lake, still in the foreground, there are several structures that are incompatible with the scenic quality of the surrounding landscape. On the rocky hillside above the lake side structures, there is a large white retaining wall. The middle ground from this view consists of the horizon line of wooded hilltops. There is no background in this view due to the confined nature of the view.

The overall Scenic Integrity Objective of this view is low. The deviations (lakeside structures, fencing, retaining wall) dominate the view and do not share attributes with the surrounding landscape.

### **6.4.2.2 Proposed Conditions**

The proposed condition view includes the Bad Creek II lower reservoir inlet/outlet structure, the access portal structure, and an exposed rock slope.

The proposed changes to this view are visible throughout the year and are visually noteworthy. The proposed white access portal and lower inlet/outlet structure significantly contrast with the

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<sup>15</sup> Potential modifications associated with remediation of the landslide that occurred on January 20, 2024, are not reflected in either the existing conditions or proposed conditions.

adjacent trees and lake. The exposed rock slope behind these structures highlights the visual intrusion. The combination of proposed grading, clearing, and built structures have a substantial visual effect on the Scenic Integrity of this view.



**Figure 6-29. Key View 3: Lower Reservoir Inlet/Outlet Structures Viewed from Whitewater River cove of Lake Jocassee (Top- existing conditions; Bottom-proposed conditions)**

### **6.4.3 Key View 4 – Bad Creek Visitor Overlook (Northwest)**

Duke Energy's Bad Creek Visitor Overlook is accessed from Bad Creek Road (Figure 6-30). It includes a gazebo that provides views of Lake Jocassee and the surrounding landscape. The team found the clearest view of existing Project facilities is not at the gazebo, but closer to the parking area along the fence line for the site.

#### **6.4.3.1 Existing Conditions**

At this Key View (4), the overall scenic class rating is 3 (moderate to high value). The colors are generally dark browns and grays with patches of dark green, in leaf off conditions. There is a tan line along the shoreline, which contrasts with the dark blue/black of the lake. Dominant lines and textures are defined the rolling slopes, the understory vegetation, and the undulating horizon line. The effect of adjacent scenery is predominant; framed by the slope and vegetation in the foreground.

The dominant view is of the middle ground and background, framed by shrubs and small trees in the immediate foreground and foreground. The immediate foreground is dominated by understory vegetation and a few small trees around the periphery. The middle ground from this view consists of a sloping hillside with low grassy vegetation. Also in the middle ground is the visible section of Lake Jocassee and the shoreline. There is a steep rocky ravine bisecting the mountains, providing visual interest. The cultural modifications in this view are located in the middle ground; the pale gray and tan lower inlet/outlet structure along the shoreline and a transmission tower on the sloping wooded hillside. The background is visible and dominant throughout the year due to lack of screening vegetation. The horizon line is attractive due to the undulating line of the ridge and the contrast with the sky.

The overall Scenic Integrity Objective of this view is moderate. The noticeable deviations (the lower inlet/outlet structure, and transmission tower) are moderately intrusive and may not be visible during the leaf-on condition.

#### **6.4.3.2 Proposed Conditions**

As shown in the proposed conditions visualizations, an upland area would be excavated in conjunction with the development of Bad Creek II's lower reservoir inlet/outlet portal and the access portal. An area of the Whitewater River cove of Lake Jocassee would also be excavated, creating a small, recessed cove adjacent to the lower inlet/outlet portal.

The proposed grading and structures are clearly visible in this view. This disturbed area is expanded by almost 100 percent and the additional structures introduce new unnatural colors to the view (dark green or blue rooftop). The excavated cove leading to the lower inlet/outlet portal is clearly visible and reflects the excavated hillside. While the area of disturbance within the view only comprises approximately 1/60th of the view area, the location within the view is dominant; the sloping lines of the mountains and the linear shape of the lake all terminate at the project site. The colors of the proposed elements (excluding the rooftop) are mostly brown, tan, and pale gray, which reflect the colors of the winter landscape (in leaf-off condition). These colors will likely be in contrast to the vibrant greens of spring and summer, which could result in pronounced visibility of the Bad Creek II features.



**Figure 6-30. Key View 4: Inlet/Outlet Portal from the Bad Creek Visitor Overlook (Top-existing conditions; Bottom-proposed conditions)**

#### **6.4.4 Key View 7 – Oscar Wigington Scenic Overlook**

The Oscar Wigington Scenic Overlook is accessed from the Oscar B. Wigington Scenic Byway in the Sumter National Forest (Figure 6-31).

##### **6.4.4.1 Existing Conditions**

At this location, the overall scenic class rating is 2 (high value). The colors are blues and grays as well as greens, tans and browns during leaf-off conditions. Dominant lines are horizontal and organic, defined by the horizon, background hills, and tops of middle ground evergreen trees. There are faint horizontal lines created by the transmission lines in the close background. Textures range from fine and sharp in the foreground vegetation to smooth and soft in the lake and hills in the background. The effect of adjacent scenery is predominant and framed by the foreground vegetation.

The dominant view is of the background, supported by the low vegetation in the foreground and middle ground. The immediate foreground is dominated by the tops of deciduous trees and large shrubs. The middle ground from this view consists of a thick swatch of evergreen trees below the horizon line. The colors are predominately dark greens. The background is visible and dominant throughout the year due to lack of screening vegetation. The long view to the straight and clean horizon line is attractive and displays a subtle contrast with the sky. There is a transmission line in the background that may glint in the sunlight and is likely visible throughout the year, although it is not visually dominant.

The overall Scenic Integrity Objective of this view is very high. The deviation (the transmission line) is minute and does not detract from the scenic quality.

##### **6.4.4.2 Proposed Conditions**

As with existing conditions, the only Bad Creek II features visible from the overlook are associated with the primary transmission line. Both additional conductors (i.e., wires) and transmission towers would be visible.

The visual impact of the proposed transmission lines is noticeable but not significant. The bright metallic clusters accentuate the undulating horizontal lines that stretch across the close background portion of the view, but the overall impact to the view is minimal.



**Figure 6-31. Key View 7: Project Primary Transmission Line from the Oscar Wiginton Scenic Overlook (Top-existing conditions; Bottom-proposed conditions)**

## **6.4.5 Key View 10b – Fisher Knob Point**

### **6.4.5.1 Existing Conditions**

At this Key View (10b) <sup>16</sup>, the overall scenic class rating is 3 (moderate to high value) (Figure 6-31). The colors are blues and greens, punctuated with orange, gray and tan during leaf-off conditions. Dominant lines are horizontal, defined by the ripples in the water and the tan shoreline, and diagonal, defined by the sloping hills. Textures are generally smooth and soft in the lake and hills in the background. The effect of adjacent scenery is significant due to lack of vegetative screening or other visual obstructions.

The dominant view is of the immediate foreground - the lake. From this view, the lake comprises most of the view and provides an attractive contrast to the tree-covered hills in the middle ground and background. The middle ground from this view consists of the tan shoreline, perforated by wooden boat docks and other structures. The buildings within the middle ground appear to be constructed of wood and glass and are gray, brown, and dark green. While the colors and heights of the buildings are not overly visually intrusive, they are clearly visible and would likely not be screened during the leaf-on condition. The background is visible throughout the year due to lack of screening vegetation. The horizon line provides interest as it is located in the middle ground on the left side of the view and recedes into the background as the viewer looks to the right. As the lake extends into the background plane, there is a clear and dominant view of the lower inlet/outlet structure on the far hill side, in the center of the view.

The overall Scenic Integrity Objective of this view is moderate. The noticeable deviations (the lower inlet/outlet structure, buildings, and boat docks) are visually subordinate to the overall landscape character.

### **6.4.5.2 Proposed Conditions**

As shown in the Proposed Conditions view, the Bad Creek II lower reservoir inlet/outlet structure, access portal, the excavated hillside associated with the structure, and a new interconnect transmission line are visible. The proposed clearing, grading and development are clearly visible in this view. Due to the central location of the Bad Creek II facilities within the

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<sup>16</sup> Potential modifications associated with remediation of the landslide that occurred on January 20, 2024, are not reflected in either the existing conditions or proposed conditions.



view, the impact is visually significant. The colors of the proposed elements are mostly brown, tan, and pale gray, which stand in contrast to the blue-gray lake and adjacent cluster of evergreen vegetation.



**Figure 6-32. Key View 10b: View of the Project from Fisher Knob Point (Top-existing conditions; Bottom-proposed conditions)**

## 6.5 Task 7 – Visual Management Consistency Review

The Project and its facilities are situated within a landscape of high visual and environmental quality. The Project area provides access to Jocassee Gorges Wildlife Management Area, Lower Whitewater Falls, and an overlook of Lake Jocassee. It is partially visible from surrounding public use areas and properties including the Sumter National Forest, Lower Whitewater Falls Observation area, the Visitor Overlook off Fisher Knob Road.

Stakeholders are required to be involved in the proposed development process. Various local, state, and federal entities share management of the Lake Jocassee area associated with the Project. These include Oconee County, the USFS, and the SCDNR.

Task 7 of the study included a review of applicable resource protection guidance established in applicable land use plans and regulations to determine alignments or conflicts with the proposed landscape interventions. As described below, there are no conflicts between current visual management plans and the Project or Bad Creek II.

### 6.5.1 Consistency with USFS Management Plans

The USFS, which manages a significant portion of the land in the northern Lake Jocassee area and some sections to the west, operates under the U.S. Code and the CFR. These codes define how the USFS manages national forest and grasslands. The agency has the responsibility to manage lands in a manner that will protect the quality of scenic values. The USFS also has guidelines in place to protect visual resources. The guidelines focus on preserving the natural landscape, minimizing visual disturbances, maintaining the overall aesthetic appeal of the forested areas, as well as managing natural resources for the good of the nation. They may include restrictions on clear-cutting, limitations on the size and location of infrastructure, and requirements for visual impact assessments.

USFS restrictions apply only USFS-managed lands and the management plans do not impose viewshed requirements on the surrounding area, therefore the proposed development of Bad Creek II does not conflict with the USFS management plans described in Section 6.1.3.1 and

Section 6.1.3.2<sup>17</sup>. The primary transmission line corridor bisects a section of USFS-managed land; the clear cutting required for the transmission corridor widening is in alignment of the management of this National Forest section for timber production, so there is no conflict.

### **6.5.2 Consistency with Jim Timmerman Natural Resources Plan**

SCDNR plays a crucial role in protecting the state's natural resources, including visual resources. They collaborate with other agencies and stakeholders to develop land use plans that prioritize the conservation and preservation of scenic landscapes. These plans may include designated scenic corridors, protected viewsheds, and guidelines for managing development in sensitive areas. SCDNR has established regulations for the protection, preservation, operation, maintenance, and use of wildlife management areas and Heritage Trust areas. Regulations related to visual resource protection are not explicitly mentioned, nor would they apply to the Project or Bad Creek II.

### **6.5.3 Consistency with Oconee County Comprehensive Plan**

Oconee County South Carolina's comprehensive plan guides future actions of the county. The plan provides direction for future activities over a 10–20-year time frame. The County has implemented land use regulations that specifically address visual resource protection. These regulations aim to maintain the scenic quality of the area by controlling development activities and ensuring that new construction projects are visually compatible with the surrounding environment. Specific regulations include setback requirements, buffer requirements, building height restrictions, and design guidelines. Utility projects are specifically excluded from the Comprehensive Plan requirements for visual resource protection, so the both the Project and Bad Creek II would be consistent with the Comprehensive Plan.

### **6.5.4 Consistency with KT SMP**

The KT SMP was developed by Duke Energy in compliance with FERC requirements as a guiding document to “manage shoreline development to be consistent with project purposes, including the protection and enhancement of the project’s scenic, recreational, cultural, and other

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<sup>17</sup>Guidance for utility projects is available in the USFS’s 2018 publication “Mitigating Visual Impacts of Utility-Scale Energy Projects”. This paper focuses on approaches, processes, and techniques for mitigating visual impacts. Strategies include avoidance, siting measures, and design measures in concert to minimize and mitigate impacts.

environmental values” (Duke Energy 2023). The SMP defines acceptable activities within the KT Project boundary. The shoreline classification for the lower inlet/outlet structure is “Project Operations” and the construction of the lower inlet/outlet is consistent with this classification, including associated vegetation clearing and shoreline development.

## 6.6 Task 8 – Mitigation Assessment

Few adverse visual effects were identified during development of visualizations; however, potential PM&E measures that would further reduce visual effects are described in this section. A summary table of potential PM&E measures is included in Table 6-2.

### 6.6.1 Building and Roof Paint Colors

The existing Project buildings are generally painted light tan or various shades of blue (Figure 6-32). The roofs are silver metal. To reduce visual contrast, Bad Creek II metal or wooden buildings could be painted using earth tones (i.e., gray, light brown, khaki green) to better blend with the surrounding landscape. To reduce visual contrast in color and reflectivity, Bad Creek II metal roofs could be painted using mid-tone earth tones (i.e., gray brown, khaki green) in a matte finish to better blend with the surrounding landscape.

- **Feasibility:** High. Bad Creek II metal and wooden facilities and roofs would likely require painting, so selecting paint colors and finishes could be accomplished during project planning efforts.
- **Cost:** This would be a relatively low-cost PM&E measure since the new metal and wooden facilities would likely require painting and substituting different colors and finishes would result in little to no additional cost.
- **Effectiveness:** Paint color could decrease the contrast between Bad Creek II structures and the vegetation surrounding the site, dependent upon the color selected and time of year. However, paint colors that would blend with the surrounding landscape during leaf-off season (i.e., browns, tans, and grays) would likely not blend with leaf-on conditions (shades of green), though selecting earth-tones will match the color family. Further, paint color would not eliminate the horizontal lines associated with the structures that would contrast with the sloping lines of the mountains and hills surrounding the site.



**Figure 6-33. View of Existing Warehouse and Administrative Office Complex from the Entrance to Musterground Road**

### **6.6.2 Building and Roofing Materials**

New construction can select building and roofing materials in integral colors that reduce visual contrast from the surrounding landscape and will not require later painting or other retrofit mitigation efforts in the future.

The building materials can be selected to reduce color and textural differences from the surrounding landscape. Current building siding material at the Project is often metal. Metal has a smooth finish that creates more reflectivity and differs in texture from the vegetation and rock faces in the surrounding context. Alternative siding or construction materials include wood, stone veneer, concrete block (split-face concrete block has the most texture), and fiber cement panels. These materials come in a variety of integral earth-tone colors that would blend with the surrounding landscape, and because the colors are integral to the material, will not require maintenance to maintain the color. Stone veneer and concrete masonry units can be selected to match the color of indigenous rocks, reducing the contrast of the new construction to the surrounding landscape and using the same “language” of materials.

Metal roofing (steel) is a durable, low-maintenance, and long-lived roofing material appropriate to industrial projects. The powder-coating method bonds the color to the metal surface, and will not require future painting to maintain the color. Metal roofs are available in a variety of powder-coated colors in earth-tone shades (gray, brown, khaki green). If available from the manufacturer, a matte finish could be selected to reduce the textural difference and reflectivity of the roof, to reduce its impact on the surrounding landscape.

- **Feasibility:** High. During the construction of new facilities, the materials will be selected as part of the design process. Siding materials and roof materials can be selected during this process.
- **Cost:** Low to High depending upon material. Metal siding is the most cost-effective material for industrial scale buildings. Cladding an industrial building in the other materials or constructing from block will be several times more expensive. Smaller scale office and utility housing structures are often constructed of block. Selecting a concrete masonry block unit that is textured and colored in an earth tone would be little to no additional cost. Steel metal roofing is often selected as the material for industrial buildings, including for office and utility facilities, due to its long lifespan, durability, and low maintenance. Selecting a color that is earth-toned during the design process would have no additional cost. There is potential for a matte finish selection to have low-no additional cost.
- **Effectiveness:** Moderate. Selecting materials with texture reduces the contrast of texture and reflectivity from the surrounding landscape of vegetation and exposed rock faces. Using a stone cladding or split-face concrete block in colors similar to the indigenous rock of the area will further reduce the contrast of materials, color, and texture of the buildings compared to the surroundings. The straight horizontal and vertical lines of the buildings would still be in contrast to the angles and organic lines of the surroundings, but matching materials, texture, and color would reduce the contrast. Selecting building and roof colors that match the surrounding landscape during leaf-off season (i.e., browns, tans, and grays) would likely not blend with leaf-on conditions (shades of green), though selecting colors in mid-range earth-tones would reduce contrast in both leaf-off and leaf-on conditions.

### **6.6.3 Exposed Rock Walls, Concrete Walls and Retaining Walls, and Concrete Treatments**

The Project site contains steep topography that requires excavation and stabilization efforts resulting in exposed rock walls as well as concrete retaining walls. Some Bad Creek II structures, notably the upper and lower inlet/outlet structures and the access portal would be constructed of concrete.

Exposed rock walls, even though they are native bedrock, initially are visually different from naturally weathered rock walls. Over time, however, newly exposed rock walls will weather and darken, more closely resembling natural rock outcroppings.

Likewise, concrete retaining walls such as the wall in Figure 6-33 are lighter in color than the surrounding landscape or naturally occurring exposed rock. Further, concrete walls introduce straight lines into the landscape which are visually intrusive. In the same manner that newly exposed rock walls weather and darken over time, exposed concrete also changes color.

However, it remains a lighter color than exposed rock even after significant time has passed.

Penetrating acid-based stain can be applied to new and existing concrete surfaces. The stain penetrates beyond the surface of the concrete and reacts chemically, creating a permanent bond. The stain is translucent and matte, and results in a marbling effect due to the penetration, giving it a more natural appearance. The stain is available in a variety of earth-tones. The stain can be applied to new concrete or existing concrete walls, structures, and surfaces, though the existing surfaces would first need to be cleaned by pressure-washing. As the concrete surface wears away over time, the color will fade. This treatment has an approximately 20-year lifespan. This is shorter than the lifespan of the concrete, but would address the significant difference in tone when the concrete is first installed, when it is very pale in contrast to the mid- and dark-tones of the surrounding landscape. As the stain color weathers away, the concrete surface would also collect dust and dirt, darkening the surface.



*Image source: Duke Energy*

**Figure 6-34. Existing Lower Inlet/Outlet Structures with Concrete Retaining Wall**

- **Feasibility:** Mitigation measures for exposed rock and existing concrete walls are limited given the size of these structures and requirement to access the structures to clean and then apply a stain. Staining new concrete structures is more feasible than staining existing structures because the surface is already clean and mobilization and access has already been provided at the project area.
- **Cost:** Moderate. The cost per square foot of application is relatively low, with the variables of square footage applied and potential difficulty of access increasing the mitigation cost to different levels.
- **Effectiveness:** Mitigation of exposed rock is not needed given visual effects diminish over time due to natural weathering of the rock.

The pale color of concrete walls and structures are initially high in both color and tone contrast with the adjacent dark browns, greens, and grays of rock and vegetation. Concrete fades in brightness to a high contrast over 10-20 years. Coating the concrete walls with an acid stain at the time of installation would reduce that initially very high contrast to a similar tone and color to the surrounding landscape, allowing for a more

gradual weathering process. The staining would not address the straight horizontal line of the wall, which would contrast to the sloping and varied lines of the surrounding rock and landscape, but the visibility of the line would be reduced by reducing the color and tone contrast of the wall and the surroundings. The concrete walls are a large and contiguous visually identifiable feature, especially from the waters of Lake Jocassee. Staining them would reduce their visual contrast in tone and color and reduce their visual impact.

#### **6.6.4 Revegetation of Spoil Areas and Disturbed Areas**

Duke Energy would revegetate spoil areas and other areas used during construction of Bad Creek II. Plant species selected for revegetation efforts would affect how quickly areas become revegetated and contrast with the surrounding landscape diminishes. Over time, as the plants mature and fill in over 20-30 years, the spoil areas would visually blend with the adjacent existing vegetation.

- **Feasibility:** Duke Energy would be required to permanently stabilize spoil areas with vegetation and revegetate areas disturbed during construction. Stabilization of such areas with vegetation is a standard construction technique.
- **Cost:** Since Duke Energy's construction permits would require some sort of revegetation effort, the incremental cost for this effort is relatively low.
- **Effectiveness:** Effectiveness would initially be driven by how quickly vegetation becomes reestablished and whether or not the species selected are visually consistent with the surrounding landscape. Over time as the vegetative community is established and becomes more consistent with surrounding areas, the visual effects of spoil areas would likely become minimal.

#### **6.6.5 Fencing**

Security fencing would likely be installed during construction to limit access to areas and reduce vandalism or theft of construction materials and equipment. Permanent fencing around the Bad Creek II transformer and switchyard would be installed to prevent unauthorized access to the critical infrastructure equipment similar to the fencing around the Project transformer yard fencing (Figure 6-34). The type of color of such fencing could reduce visual effects associated

with fencing or screening walls. Selecting colors in dark tones of gray or brown would minimize their visual impact to the landscape, by reducing contrast.



**Figure 6-35. Project Transformer Yard**

- **Feasibility:** Construction of fencing around some Bad Creek II components is possible, but not all. For example, it would be neither feasible nor beneficial to fence the expanded primary transmission line corridor. However, installation of fencing around the Bad Creek II transformer yard and switchyard would occur.
- **Cost:** Installation of fencing around the transformer yard and switchyard is Duke Energy's typical practice, so the incremental cost of this measure would be relatively low.
- **Effectiveness:** Installation of fencing or screening materials would introduce additional intrusions on the landscape. Darker colored fencing could decrease the visual effects of fencing and screening, particularly from a distance, but such fencing would still become apparent with proximity to the fencing.

Screening views of the principal Bad Creek II features with fencing or other types of screening would be unlikely to be effective. The Bad Creek II transformer and switchyard would be visible from Lower Whitewater Falls Trailhead and the Musterground Road entrance. The height of the equipment within both yards would exceed practicable fence designs.

### 6.6.6 Landscape Screening and Plantings

Landscape screening of trees and shrubs could be installed to visually shield and blend project elements into the landscape.

- **Feasibility:** Installation of landscape screening around some Bad Creek II components is possible, but not for all features. For example, it would be neither feasible nor beneficial to screen the expanded transmission line corridor. However, installation of landscaping around the Bad Creek II transformer yard and switchyard could occur, as well as around the perimeter of the Lower Whitewater Falls trailhead parking lot. There is some feasibility to install landscape screening along the water's edge to shield the existing and proposed lower inlet-outlet, by providing a landscaping buffer between the rip-rap embankment on the water's edge. Over time, however, maintenance of trees in this area may be problematic or create potential hazards to Project structures.
- **Cost:** Low - Installation of landscaping around the transformer yard and switchyard is a typical practice and landscape installation is generally cost efficient in comparison to constructed elements, as it does not require engineering or earthwork.
- **Effectiveness:** Evergreen hedges around the transformers and switchyards would visually shield the fencing and the lower segment of the installation, reducing the impact on the landscape. Due to the height of the elements, landscaping screening will not entirely shield the installations. Evergreen trees are fast growing and would provide significant screening within 10 years, but limited visual screening would be provided before then. Installing visual screening close to the viewer would provide a greater height of screening relative to a distant object than screening closer to the object (Figure 6-36). For this reason, providing visual landscape screening close around the trailhead parking lot would provide visual screening to the constructed elements around the parking lot. Installing landscaping at the lower inlet/outlet structure facility would not entirely shield the facility but would provide a softening and a blending of the constructed elements as the

landscaping matures over 15+ years. Selecting fast growing trees and evergreen trees would shorten the time to achieve visual screening. As noted above, however, it may be problematic for Project maintenance to maintain woody vegetation in this area.



**Figure 6-36. Effectiveness of Landscaping for Shielding Based on Proximity to Viewer**

### **6.6.7 Landscape Berms**

Landscape berms, or constructed low hills, can be installed to visually shield and blend project elements into the landscape. The berms are often planted after installation, which give additional height to the screening plants. Landscape berms are most appropriate in locations where there is sufficient space to accommodate a berm, typically forming a 2.5:1 slope with at least 2 ft at the crest of the berm. Therefore, to accommodate a 3-ft-high berm, there would need to be at least a 17-ft-wide space. Berms can be anywhere from 2 ft to over 20 ft. Berms shield the view of anything behind them. Shorter berms can be seen over but provide a softening of the landscape and can be used in conjunction with fencing and landscaping to screen views.

- **Feasibility:** The topography of the site is generally severe and limits the availability of land suitable for constructing berms. Further, it would be necessary to ensure such berms would not adversely affect wetlands, waters, or sensitive species and their habitat.
- **Cost:** The cost associated with constructing berms varies with the site context. In areas where there is sufficient space and earthwork activities are already occurring, the cost would be relatively low. Larger berms on significant topography that expand a project's limit of disturbance would have more significant costs associated with permitting and construction.
- **Effectiveness:** As with landscape screening and plantings, the effectiveness of berms would be dependent upon the height of the berm and the proximity of the berms to the viewers with effectiveness increasing as viewers move closer to the berms.

### 6.6.8 Transmission Towers and Conductors: Materials

The existing Project primary line and associated conductors are made of steel with a galvanized finish. A weathered steel finish can be used which is less visually intrusive than the lighter color standard galvanized steel (Figure 6-37).

- **Feasibility:** Use of weathered steel for transmission towers and conductors is a generally accepted practice for transmission line design in visually sensitive areas.
- **Cost:** Weathered steel would cost approximately 10 percent more than galvanized steel.
- **Effectiveness:** The Bad Creek II primary line would parallel the existing Project primary line. While use of weathered steel for towers or conductors, or both, would reduce the visual effects of the feature, it would not eliminate it, particularly when the structures are in the foreground or middle ground. Furthermore, since the Bad Creek II line would parallel the existing line, the existing line visual effects would continue unabated.



**Figure 6-37. Example of Weathered Steel Monopoles along a Trail**

### 6.6.9 Transmission Towers: Location Relative to the Horizon

The current primary transmission line towers are sited on the peaks and the conductors (i.e., electrical lines) are suspended 100+ ft over valleys and ravines. This means that the towers are silhouetted and visible from a distance, increasing their visual impact to the landscape. The new primary transmission line towers could be located on the shoulders of the peaks in a manner such that the tops of the towers would be lower than the elevation of the surrounding peaks. This would likely require a less direct route for the Bad Creek II primary transmission line requiring more towers, line, and an expanded cleared ROW to accommodate the primary transmission line deviating from paralleling the existing primary transmission line towers.

- **Feasibility:** Duke Energy holds the rights to the land parcels the primary transmission line passes through and could identify locations that maintain the tower heights below the horizon. This would require significantly greater effort compared to paralleling the existing primary transmission line towers, requiring additional clearing of ROW, and construction of new access roads. Additional environmental impacts would be anticipated associated with impacts to waters and wetlands located within valleys and ravines.
- **Cost:** Duke Energy is already planning to clear additional corridor for the Bad Creek II primary transmission line. However, costs would increase significantly to locate and construct towers away from current primary transmission line towers due to difficulty accessing tower locations, environmental permitting, and mitigation for resource effects.
- **Effectiveness:** Siting the Bad Creek II transmission line to avoid silhouetting towers would reduce an element of visual impact but would also increase the visual impact of the forest clearing associated with the transmission corridor. In addition, the existing primary transmission line towers would remain in place.

### 6.6.10 Lighting: Motion Activated

Motion activated lighting reduces overall lighting intensity with lighting levels operating at reduced or no output as the default, increasing to the standard lumens only when actually needed (when motion is detected). Motion activated lights can be programmed to run from dusk to dawn and set to 0 to 50 percent output when no motion is detected. The option to operate the lighting at 10 to 50 percent output allows for security and wayfinding in the general area, while reducing light pollution.

- **Feasibility:** Motion activated and programmable lighting has become more widely available as smart technologies continue to expand. There are numerous manufacturers of programming systems and hardware to facilitate motion activated lighting. Motion activated and dimmable lighting are most compatible with light-emitting diode (LED) light systems. LED lighting is quickly becoming the standard lighting system due to its energy efficiency and color tone customization, which increases the feasibility of installing a motion-activated variable light intensity system at the Project. Motion activated lights are most feasible for areas that require task or transportation lighting, where motion can be detected, and where activity occurs within a discrete time window.
- **Cost:** Installing and maintaining a motion activated lighting system would require an initial additional upfront cost to the lighting system, but the energy cost savings from reduced lighting output may recoup the expenditure over the lifetime of the system.
- **Effectiveness:** Motion activated lights are highly effective at reducing aggregate light output. As discussed in Section 6.7.3, controlling lighting quantity and timing are one of the five key principals of light pollution reduction and motion activated lights are a key method to achieve this.

#### **6.6.11 Lighting: Fully-shielded Light Fixtures**

Light fixtures can be shielded with a cap to direct light to the ground where needed and prevent light from being directed above the horizon or 90 degrees. This limits light pollution, but refracted light within the fixture can still be directly upward, above 90 degrees. Fully shielded fixtures, or full-cutoff fixtures, have the bulb recessed into the fixture, which creates a more angled light beam with a sharp cut off line, directing the light exactly where it is needed, and preventing spillover of refracted light above 90 degrees (Figure 6-38). Fully shielded fixtures are a best practice standard for reducing light pollution.



**Figure 6-38. Example of Fully Shielded Streetlight Fixtures**

- **Feasibility:** High. There are a wide variety of fully shielded lighting styles, finishes, and price points from a range of manufacturers. DarkSky International (DarkSky) lists approved light fixtures on their website (<https://darksky.org/what-we-do/darksky-approved/products-companies/>) so identifying an approved fully shielded fixture is easily accessible.
- **Cost:** Low. Cost for fully shielded light fixtures would be comparable to other lighting types. The cost of lighting has already been allocated in construction costs. Therefore, the cost for installing fully shielded lighting fixtures at the proposed project would be low.
- **Effectiveness:** High. Fully shielded lights are highly effective at targeting the direction of lighting and preventing light from being directed above the horizon. Targeting light and aiming lights down are one of the five key principles of light pollution reduction, as identified by DarkSky, and fully shielded lights are the gold standard to achieve this.

### 6.6.12 Lighting: Elimination of Unnecessary Existing Lights

Eliminating unnecessary existing lighting or reducing excess lighting to standard levels will offset Bad Creek II lighting effects, consistent with DarkSky best practices for lighting. Further, eliminating unnecessary lighting reduces operating costs.

- **Feasibility:** Existing facility lighting could be evaluated to determine if lighting is needed for the area based on use patterns and if the lighting quantity (lumens or footcandles) meets or exceeds standards set by the Illumination Engineering Society of North America (IESNA). If the lighting levels exceed the standard, the lighting could be reduced or eliminated, as appropriate.
- **Cost:** Low. Unnecessary lighting could be removed or use discontinued with minimal effort. Costs associated with the initial removal or disconnection of fixtures could be offset by the elimination of costs associated with powering and maintaining the lights.
- **Effectiveness:** Low. Removing unnecessary existing lighting will mitigate the aggregate impact of the additional lighting that will be required for Bad Creek II. However, there may be few unnecessary existing lights compared to the number of additional lights associated with Bad Creek II required, so removing them would likely have a minimal impact on the Project lighting impacts as a whole.

### 6.6.13 Lighting: LED Lighting

LED lighting has been growing in popularity due to its functional features of color tone selection, dimmability, longevity, and especially for its energy efficiency. Manufacturers now offer a wide selection of fixtures available as LED.

- **Feasibility:** High. Lighting will be required with Bad Creek II. LED lighting is available in a wide variety of fixture types. Installing LED fixtures also allows for DarkSky best practices of dimming and motion sensor lighting, as well as warm color tone lighting selection.
- **Cost:** Cost for LED lighting is now comparable to other lighting types, with a lower lifespan cost due to longevity of bulbs and energy efficiency. The cost of lighting has already been allocated in construction costs. Therefore, the cost for installing LED lighting in the project would be low.

- **Effectiveness:** LED lighting is most effective as a mitigation measure when other capabilities of the lighting type are employed including dimming and light color temperature.

#### 6.6.14 Lighting: Warm Color Spectrum

Lighting is available in a color spectrum of cool to warm, measured in Kelvins (K). White light is 4,000K-4,500K. A cool blue toned light would be 6,000K while a warm toned light would be 2,700K (Figure 6-39). According to DarkSky, research has found that cool, blue-toned lights brighten the sky more than warm, amber-toned lights, and blue light has a greater negative impact on the health of people and the environment than warm light. For this reason, DarkSky recommends outdoor lighting be in the warm color spectrum, of 3,000K or less, with a temperature of 2,700K ideally.



**Figure 6-39. Color Temperature Spectrum of Lighting (Measured in Kelvins)**

- **Feasibility:** High. New lighting would likely be required at Bad Creek II facilities. Selecting a warm color temperature of the lighting could be included in the design process. There is also the possibility of adjusting the color temperature of existing lighting. There is high feasibility if the fixture is an LED, the bulb can simply be replaced with warm spectrum bulb. If the existing lighting system is mercury vapor or metal halide, both cool temperature lighting, the light fixture itself would need to be replaced, which introduces additional complexity.

- **Cost:** Installing warm color spectrum lights in new installation would be low because the cost of lighting has already been allocated in construction costs. Replacing existing cool temperature LED bulbs with warm toned bulbs would also be relatively low cost because the fixtures would remain. The cost for replacing the existing lighting system, if mercury vapor or metal halide, would be moderate. The replacement would likely be with LED lights, which require less power than other lighting systems, so the utility conduit would remain in place, but the fixtures would be replaced.
- **Effectiveness:** Using warm temperature lighting is highly effective for reducing light pollution while not compromising visibility or security.

**Table 6-2. Summary of Potential Visual PM&E Measures**

| Potential PME Measure                                | Feasibility | Estimated Cost Range | Effectiveness |
|--|-------------|----------------------|---------------|
| Building paint colors                                | High        | Low                  | Moderate      |
| Building and roofing materials                       | High        | Varies               | Moderate      |
| Retaining / concrete wall treatments                 | Moderate    | High                 | Moderate      |
| Revegetation of disturbed areas                      | High        | Low                  | High          |
| Fencing  | Moderate    | Low                  | Low           |
| Landscape screening and plantings                    | High        | Low                  | Moderate      |
| Landscape berms                                      | High-Low    | High-Low             | Moderate      |
| Transmission tower material selection                | Moderate    | Moderate             | Moderate      |
| Transmission tower locations                         | Low         | High                 | Moderate      |
| Lighting: motion-activated lighting                  | High        | Moderate             | High          |
| Lighting: fully shielded light fixtures              | High        | Low                  | High          |
| Lighting: elimination of existing unnecessary lights | Moderate    | Low                  | High          |
| Lighting: LED lights                                 | High        | Low                  | Moderate      |
| Lighting: warm color spectrum                        | High        | Low                  | High          |

## 6.7 Task 9 – Conceptual Design of Bad Creek II

### 6.7.1 Site Layout and Proposed Conceptual Design

Duke Energy has designed Bad Creek II to utilize existing Project features to the maximum extent possible to reduce additional impacts to the surrounding lands. This includes using the same upper and lower reservoirs, existing Bad Creek site roadways, and existing ancillary support structures as feasible. The new transmission line will adjoin the existing primary transmission line, so will be consistent with existing visual effects. Other than some potential upland spoil areas and the proposed Fisher Knob temporary access road, most Bad Creek II features are located in areas of the site that have previously been developed including some proposed spoil areas.

See Figure 6-40 for a rendering of existing and proposed Project and Bad Creek II features. This rendering is based on conditions approximately five years following revegetation of spoil areas<sup>18</sup>.

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<sup>18</sup> As discussed in Section 5.9 the rendering includes all potential spoil areas even though some will not be used.



**Figure 6-40. Rendering of Bad Creek II Conceptual Site Layout**

## 6.7.2 Proposed Construction Methods and Effects on Visual Resources

Construction of Bad Creek II is anticipated to require approximately seven years. As demonstrated above, direct views of the site are limited by its remote location within a sparsely populated area, site and surrounding topography, and the generally forested condition of surrounding lands. Therefore, construction of Bad Creek II facilities including the transformer yard, switchyard, many spoil areas, the upper intake/outlet portal, and the temporary access road will generally be visible only while on the site itself. The only public access that would be available during construction would be access for Fisher Knob property owners via the temporary access road. Since the public would be excluded from the site during construction, only Duke Energy personnel and construction workers would have direct views of these features. Similarly, boaters would be excluded from the Whitewater River cove during construction, limiting views of the lower intake/outlet construction from the water. Some Fisher Knob residents would continue to have views of this area from their property during construction.

Construction activities for Bad Creek II could affect visual resources as described below:

- **Vegetation removal:** When possible, Duke Energy will use existing parking lots and equipment and material storage areas to limit the amount of vegetation needing removal. However, when vegetation removal is needed for temporary laydown, construction areas, spoil areas, the temporary access road, and the Bad Creek II primary transmission line including access roads to tower locations, Duke Energy will limit such vegetation removal to only the amount necessary and revegetate areas as construction activities cease. These areas would likely be visible only to Lake Jocassee boaters and from a few homes at Fisher Knob.
- **Spoil area development and use:** As discussed in Section 5.9, Duke Energy will revegetate spoils areas when spoiling operations are complete. During construction, these areas would generally not be visible from outside the site. Over time as the vegetation continues to grow, these areas will become less apparent and blend with the surrounding landscape.
- **Turbidity in Lake Jocassee:** Erosion control measures will be implemented to reduce erosion into Lake Jocassee tributaries and prevent construction waters from leaving the site to the extent practicable. All work would be done consistent with Duke Energy's

permits which should limit visible effects to Jocassee water clarity. Since boaters will be excluded from the Whitewater River Cove during construction, increased localized turbidity within the Whitewater River cove would likely not be apparent to Lake Jocassee boaters or Fisher Knob residents.

- **Dust control measures:** Duke Energy would undertake dust control measures during construction including the application of water on haul roads and on disturbed areas that could create dust; stabilization of disturbed areas using water, tarps, or vegetative ground cover; implementation of a means for eliminating atmospheric discharges of dust during mixing, handling and storing of cement, aggregate, and similar materials; removal of soil from equipment leaving the site; and, cleaning of public roads as needed to remove visible track out of mud. These measures should limit the visibility of dust from offsite locations.

### 6.7.3 Lighting Evaluation

Relicensing participants have expressed concerns about the potential effects of additional lighting associated with Bad Creek II and an interest in limiting light pollution associated with the Project. This section provides an overview of lighting concepts and the potential effects of Bad Creek II. It should be noted that lighting during construction would likely differ from existing lighting effects as well as post-construction lighting.

IESNA develops American National Standards Institute (ANSI) standards related to illumination. As set forth in the IESNA Lighting Handbook (Rea and IESNA 2000), safe environments for workers and site visitors require adequate illumination levels. Engineers and architects use ANSI standards to design lighting plans, select lighting fixtures, and address other lighting-related issues to achieve safe environments. Recommended lighting levels vary by the activity to be performed, such as walking along a path or working on machinery. However, lighting can also obscure views of the stars, negatively affecting the public's experience of the surrounding landscape, and affect wildlife (Jägebrand and Spoelstra 2023). Therefore, identifying the appropriate amount of lighting for a site requires a balancing of interests.

DarkSky is a membership-based advocacy organization focused on reducing light pollution and promoting responsible, healthy, and functional artificial lighting. DarkSky certifies lighting fixtures, designates International Dark Sky Places, advances responsible outdoor lighting, and

educates the public about the effects of artificial lighting. In partnership with IESNA, DarkSky has identified five principles for responsible outdoor lighting (DarkSky 2024):

1. Useful: Use light only if it is needed. Consider how the use of lighting will impact the human and natural environment.
2. Targeted: Direct light so it falls only where it is needed. Using shielding and point light downwards.
3. Low Level: Light should be no brighter than necessary. Use the lowest light level possible and consider surface conditions which may reflect light skyward.
4. Controlled: Use light only when needed. Use timers and motion detectors that dim or turn lights off when they are not needed.
5. Warm-colored: Use warmer color lights where possible and limit the amount of shorter wavelength light.

The area immediately surrounding the Project has little outside lighting other than the lighting associated with the Project and the residences located at Fisher Knob. At the Project, lighting is generally limited to Project buildings and parking areas associated with those buildings, security gate access points, and the Bad Creek Foothills Trail parking lot (Figure 6-41). Most lighting fixtures were originally installed in conjunction with the initial construction of the site in the late 1980s through 1991. The existing light poles at Project buildings and Bad Creek Foothills Trail parking lot appears to be in the cool spectrum, above 3,000 Kelvins, which does not meet DarkSky standards for warm-colored lighting. In those areas, the light fixture heads appear to be full-cut off, which meets DarkSky standards for targeted lighting. The trailhead has lighting, which may not be needed, because most trail users hike during daylight. There is an opportunity to reduce or eliminate lighting in this area, which would meet the DarkSky standard for evaluating usefulness of lighting. Lighting levels (brightness, lumens, foot candles) are set by IESNA Lighting Handbook for different site functions. Providing greater lighting levels than the standard contradicts DarkSky best practices. The existing lighting could be reviewed to determine that existing lighting meets, and does not exceed, IESNA standards.



**Figure 6-41. Project Warehouse, Administrative Building and Bad Creek Foothills Trail Access Parking as Viewed from the Entrance to Musterground Road at Night**

In conjunction with the collection of potential Key View photographs, views of the site at night were collected (see Appendix B for all collected photos). The team found that lights associated with Project features are visible at the site itself and from both Fisher Knob locations. As shown in Figure 6-42, lighting associated with the lower reservoir inlet/outlet portal and lights associated with the Project's existing transformer yard are visible from Fisher Knob.

Neither Project features nor light associated with Project features were visible from Devils Fork State Park or Jocassee Dam.



**Figure 6-42. View of Project from Fisher Knob Point at Night (Top-existing conditions; Bottom-proposed conditions)**

At location 3Nb, a discrete area of light is displayed. The horizon is faintly visible due to a dim light source beyond the mountain. The two areas of visible light appear to be in the middle ground. The uppermost light is existing lighting associated with the existing transformer yard; no changes to this facility are being proposed at this time as shown under proposed conditions. The lights adjoining the lake are reflected in the water. The lighting to the northeast (i.e., right side) of the lower inlet/outlet portal in the existing view are associated with the existing wastewater treatment facility. The wastewater treatment facility will be permanently relocated as part of the Bad Creek II construction and the Bad Creek II lower inlet/outlet structure would be constructed in the same general area. Therefore, lighting effects under proposed conditions are anticipated to be largely similar to existing features.

## 7 Summary and Discussion

The Project is in an area of high scenic attractiveness due to the sparsely populated rural nature of the area, surrounding mountainous terrain, the forested landscape, and the proximity of Lake Jocassee. Views of the Project are limited by the steep topography of the area and the heavily vegetated landscape surrounding the site. These conditions would remain in place during and following construction of Bad Creek II and would continue to limit the effect of both the Project and Bad Creek II on visual resources. Views of construction activities would be further limited by restrictions on public access to the construction site as well as the Whitewater River Cove in Lake Jocassee.

The scenery will be permanently altered through the addition of Bad Creek II structures although these features will be similar in appearance and adjacent to existing Project structures. Common mitigation techniques can be applied to reduce impacts to visual resources during and after construction including siting of Bad Creek II features near existing Project facilities, careful selection of lighting consistent with DarkSky guidelines, use of appropriate landscape screenings, and other mitigation measures.

## 8 Variances from FERC-approved Study Plan

Variances from the FERC-approved Study Plan were generally minor, did not substantively affect the goals, objectives, or results of the study, and were made in consultation with the RC.

They are briefly described below; refer to Section 5 for additional information.

- **Number of Key Views:** The study plan specified that Duke Energy would use up to four Key Views for developing visualizations and evaluating potential aesthetic effects. Instead, Duke Energy agreed to evaluate five Key Views including the visualization of the lower inlet/outlet structure developed during initial Bad Creek II planning.
- **Leaf-off Conditions:** The study plan specified that Key Views would be captured during leaf-off conditions. While this was done for the four Key Views captured in December 2023, the fifth Key View developed during Bad Creek II planning was done under fall conditions. However, since there is no vegetation between the viewer and Project features, the vegetation did not impede an evaluation of the effects of existing and proposed features.
- **Lighting Evaluation:** The description of Task 9 in the approved study plan does not specify how the lighting evaluation or lighting effects would be evaluated, nor does it include a visualization of lighting. Duke Energy elected to develop a visualization using a nighttime image for use with the evaluation. Duke Energy consulted with the RC to select viewpoints for use with the lighting visualization.

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A decorative graphic on the left side of the page consists of four overlapping rectangles: a large red one in the middle, a grey one above it, a light grey one below it, and a black one at the bottom right.

# Appendix A

Appendix A - Consultation  
Documentation

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**From:** [Crutchfield Jr., John U](#)  
**To:** [Amy Breedlove](#); [Andrew Gleason](#); [Andy Douglas](#); [Chris Starker](#); [Dale Wilde](#); [Dan Rankin](#); [Elizabeth Miller](#); [Kelly Kirven](#); [Ken Forrester](#); [Lynn Quattro](#); [Salazar, Maggie](#); [amedeemd@dhec.sc.gov](mailto:amedeemd@dhec.sc.gov); [cloningerp@dnr.sc.gov](mailto:cloningerp@dnr.sc.gov); [Ross Self](#); [Rowdy Harris](#); [Stuart, Alan Witten](#); [suewilliams130@gmail.com](mailto:suewilliams130@gmail.com); [William T. Wood](#); [Willie Simmons](#); [Huff, Jen](#); [phil.mitchell@gmail.com](mailto:phil.mitchell@gmail.com); [Bill Ranson-Retired](#)  
**Cc:** [Kulpa, Sarah](#); [McCarney-Castle, Kerry](#)  
**Subject:** RE: Bad Creek Relicensing - Recreation Resources Committee Meeting  
**Date:** Thursday, June 8, 2023 6:21:33 AM

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**CAUTION:** [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Bad Creek Relicensing Recreation Resources Committee Members:

Based on the received Committee stakeholder member responses, we will meet on Thursday, July 27<sup>th</sup>, 1-3 pm, at Duke Energy's Wenwood Operations Facility in Greenville, SC.

I will be sending each of you a meeting notice shortly. Note that lunch will be served at 12 pm, and you are invited to lunch prior to the afternoon meeting session. Please accept the meeting notice so I can get an accurate head count for ordering lunch.

Thanks, John

---

**From:** Crutchfield Jr., John U  
**Sent:** Tuesday, May 30, 2023 1:01 PM  
**To:** Amy Breedlove <BreedloveA@dnr.sc.gov>; Andrew Gleason <andrewandwilla@hotmail.com>; Andy Douglas <adoug41@att.net>; Bennett, Jennifer <Jennifer.Bennett@duke-energy.com>; Chris Starker <cstarker@upstateforever.org>; Dale Wilde <dwilde@keoweefolks.org>; Dan Rankin <RankinD@dnr.sc.gov>; Elizabeth Miller <MillerE@dnr.sc.gov>; Kelly Kirven <Kelly.Kirven@KleinschmidtGroup.com>; Ken Forrester <forresterk@dnr.sc.gov>; Lynn Quattro <quattrol@dnr.sc.gov>; Maggie Salazar <maggie.salazar@hdrinc.com>; Morgan Amedee <amedeemd@dhec.sc.gov>; Pat Cloninger <cloningerp@dnr.sc.gov>; Ross Self <SelfR@dnr.sc.gov>; Rowdy Harris <charris@scprt.com>; Stuart, Alan Witten <Alan.Stuart@duke-energy.com>; Sue Williams <suewilliams130@gmail.com>; William Wood <woodw@dnr.sc.gov>; Willie Simmons <simmonsw@dnr.sc.gov>; Huff, Jen <Jen.Huff@hdrinc.com>; phil.mitchell@gmail.com; Bill Ranson <bill.ranson@retiree.furman.edu>  
**Cc:** Sarah Kulpa <sarah.kulpa@hdrinc.com>; Kerry McCarney-Castle <kerry.mccarney-castle@hdrinc.com>  
**Subject:** RE: Bad Creek Relicensing - Recreation Resources Committee Meeting  
**Importance:** High

Dear Bad Creek Relicensing Recreation Resources Committee Members:

Well, unfortunately we cannot line up everyone's schedule to meet on June 30<sup>th</sup>.

**Duke Energy would like to propose convening the Recreation Resources Committee on Thursday, July 27<sup>th</sup>, 1-3 pm. The meeting location will be at Duke Energy's Wenwood Operations Facility in Greenville, SC (425 Fairforest Way Greenville, SC 29607).**

We will be convening the Aquatics and Water Resources Committees on this same date during the morning session (9 am -12 pm), and you are welcome to attend that session too which will discuss the CFD modeling results and CHEOPS modeling status (most you are on those committees too). Lunch will be served so if you can attend both meeting sessions or just join for lunch and the afternoon session, either will be fine. I will need to know your attendance for the lunch order.

**Please let me know if you can meet on Thursday, July 27<sup>th</sup>, 1-3 pm.**

-  
I apologize for the multiple emails on meeting dates, but summer schedules are busy, as you know.

A reply on this meeting date would be appreciated by the end of next week.

Regards,

***John Crutchfield***

Project Manager II  
Water Strategy, Hydro Licensing & Lake Services  
Regulated & Renewable Energy  
Duke Energy  
526 S. Church Street, EC12Q | Charlotte, NC 28202  
Office 980-373-2288 | Cell 919-757-1095

---

**From:** Crutchfield Jr., John U

**Sent:** Thursday, May 25, 2023 9:28 AM

**To:** Amy Breedlove <[BreedloveA@dnr.sc.gov](mailto:BreedloveA@dnr.sc.gov)>; Andrew Gleason <[andrewandwilla@hotmail.com](mailto:andrewandwilla@hotmail.com)>; Andy Douglas <[adoug41@att.net](mailto:adoug41@att.net)>; Bennett, Jennifer <[Jennifer.Bennett@duke-energy.com](mailto:Jennifer.Bennett@duke-energy.com)>; Chris Starker <[cstarker@upstateforever.org](mailto:cstarker@upstateforever.org)>; Dale Wilde <[dwilde@keoweefolks.org](mailto:dwilde@keoweefolks.org)>; Dan Rankin <[RankinD@dnr.sc.gov](mailto:RankinD@dnr.sc.gov)>; Elizabeth Miller <[MillerE@dnr.sc.gov](mailto:MillerE@dnr.sc.gov)>; Kelly Kirven <[Kelly.Kirven@KleinschmidtGroup.com](mailto:Kelly.Kirven@KleinschmidtGroup.com)>; Ken Forrester <[forresterk@dnr.sc.gov](mailto:forresterk@dnr.sc.gov)>; Lynn Quattro <[quattrol@dnr.sc.gov](mailto:quattrol@dnr.sc.gov)>; Maggie Salazar <[maggie.salazar@hdrinc.com](mailto:maggie.salazar@hdrinc.com)>; Morgan Amedee <[amedeemd@dhc.sc.gov](mailto:amedeemd@dhc.sc.gov)>; Pat Cloninger <[cloningerp@dnr.sc.gov](mailto:cloningerp@dnr.sc.gov)>; Ross Self <[SelfR@dnr.sc.gov](mailto:SelfR@dnr.sc.gov)>; Rowdy Harris <[charris@scprt.com](mailto:charris@scprt.com)>; Stuart, Alan Witten <[Alan.Stuart@duke-energy.com](mailto:Alan.Stuart@duke-energy.com)>; Sue Williams <[suewilliams130@gmail.com](mailto:suewilliams130@gmail.com)>; William Wood <[woodw@dnr.sc.gov](mailto:woodw@dnr.sc.gov)>; Willie Simmons <[simmonsw@dnr.sc.gov](mailto:simmonsw@dnr.sc.gov)>; Huff, Jen <[Jen.Huff@hdrinc.com](mailto:Jen.Huff@hdrinc.com)>; [phil.mitchell@gmail.com](mailto:phil.mitchell@gmail.com); Bill Ranson <[bill.ranson@retiree.furman.edu](mailto:bill.ranson@retiree.furman.edu)>

**Cc:** Sarah Kulpa <[sarah.kulpa@hdrinc.com](mailto:sarah.kulpa@hdrinc.com)>; Kerry McCarney-Castle <[kerry.mccarney-castle@hdrinc.com](mailto:kerry.mccarney-castle@hdrinc.com)>

**Subject:** RE: Bad Creek Relicensing - Recreation Resources Committee Meeting

**Importance:** High

Dear Bad Creek Relicensing Recreation Resources Committee Members:

Due to conflicts, I need to poll your availability to meet on Friday, June 30, 9 am to 1 pm.

Please reply back to me and let me know your availability to meet on that date by Tuesday, May 30 COB.

Thanks for your input.

John

---

**From:** Crutchfield Jr., John U

**Sent:** Thursday, May 18, 2023 3:06 PM

**To:** Amy Breedlove <[BreedloveA@dnr.sc.gov](mailto:BreedloveA@dnr.sc.gov)>; Andrew Gleason <[andrewandwilla@hotmail.com](mailto:andrewandwilla@hotmail.com)>; Andy Douglas <[adoug41@att.net](mailto:adoug41@att.net)>; Bennett, Jennifer <[Jennifer.Bennett@duke-energy.com](mailto:Jennifer.Bennett@duke-energy.com)>; Chris Starker <[cstarker@upstateforever.org](mailto:cstarker@upstateforever.org)>; Dale Wilde <[dwilde@keoweefolks.org](mailto:dwilde@keoweefolks.org)>; Dan Rankin <[RankinD@dnr.sc.gov](mailto:RankinD@dnr.sc.gov)>; Elizabeth Miller <[MillerE@dnr.sc.gov](mailto:MillerE@dnr.sc.gov)>; Kelly Kirven <[Kelly.Kirven@KleinschmidtGroup.com](mailto:Kelly.Kirven@KleinschmidtGroup.com)>; Ken Forrester <[forresterk@dnr.sc.gov](mailto:forresterk@dnr.sc.gov)>; Lynn Quattro <[quattrol@dnr.sc.gov](mailto:quattrol@dnr.sc.gov)>; Maggie Salazar <[maggie.salazar@hdrinc.com](mailto:maggie.salazar@hdrinc.com)>; Morgan Amedee <[amedeemd@dhec.sc.gov](mailto:amedeemd@dhec.sc.gov)>; Pat Cloninger <[cloningerp@dnr.sc.gov](mailto:cloningerp@dnr.sc.gov)>; Ross Self <[SelfR@dnr.sc.gov](mailto:SelfR@dnr.sc.gov)>; Rowdy Harris <[charris@scprt.com](mailto:charris@scprt.com)>; Stuart, Alan Witten <[Alan.Stuart@duke-energy.com](mailto:Alan.Stuart@duke-energy.com)>; Sue Williams <[suewilliams130@gmail.com](mailto:suewilliams130@gmail.com)>; William Wood <[woodw@dnr.sc.gov](mailto:woodw@dnr.sc.gov)>; Willie Simmons <[simmonsw@dnr.sc.gov](mailto:simmonsw@dnr.sc.gov)>; Huff, Jen <[Jen.Huff@hdrinc.com](mailto:Jen.Huff@hdrinc.com)>; [phil.mitchell@gmail.com](mailto:phil.mitchell@gmail.com); Bill Ranson <[bill.ranson@retiree.furman.edu](mailto:bill.ranson@retiree.furman.edu)>

**Cc:** Sarah Kulpa <[sarah.kulpa@hdrinc.com](mailto:sarah.kulpa@hdrinc.com)>; Kerry McCarney-Castle <[kerry.mccarney-castle@hdrinc.com](mailto:kerry.mccarney-castle@hdrinc.com)>

**Subject:** Bad Creek Relicensing - Recreation Resources Committee Meeting

**Importance:** High

Dear Bad Creek Relicensing Recreation Resources Committee Members:

Duke Energy would like to convene the Recreation Resources Committee to review the Visual Resources Initial Seen Analysis and identify potential Key Views for additional seen area analysis (Task 4-Key Views Selection under the schedule reviewed during our February 22, 2023, meeting).

The in-person meeting will be from 9 am to 1 pm at Duke Energy's Wenwood Operations Facility in Greenville, SC (425 Fairforest Way Greenville, SC 29607).

We have identified 3 potential meeting dates as noted in the table below. Please let me know your availability of meeting on these dates and send your response back via email (insert an X indicating

yes, a blank means you can't attend).

Based on input, I will select the best meeting data and send out a meeting notice to the Committee members.

| Name | June 22 | June 28 | June 29 |
|------|---------|---------|---------|
|      |         |         |         |

**INSERT X For Can Attend and include your name, respond back via email to John Crutchfield.**

-

**Please respond back by COB, Friday, May 26 so we can reserve the meeting room at the Wenwood Facility.**

Please let me know if you have any questions.

Regards,

***John Crutchfield***

Project Manager II

Water Strategy, Hydro Licensing & Lake Services

Regulated & Renewable Energy

Duke Energy

526 S. Church Street, EC12Q | Charlotte, NC 28202

Office 980-373-2288 | Cell 919-757-1095

# Meeting Summary

Project: Bad Creek Pumped Storage Project Relicensing

Subject: Bad Creek Visual and Recreational Resources Committee Meeting

Date: July 27, 2023

Location: Duke Energy Operations Center, Greenville, SC

## Attendees (in-person)

|  |                                |
|--|--------------------------------|
| John Crutchfield, Duke Energy                                | Elizabeth Miller, SCDNR        |
| Alan Stuart, Duke Energy                                     | Amy Chastain, SCDNR            |
| Jeff Lineberger, Duke  | William Wood, SCDNR            |
| Ethan Pardue, Duke Energy                                    | Dan Rankin, SCDNR              |
| Paul Keener, Duke Energy                                     | Erika Hollis, Upstate Forever  |
| Sue Williams, Advocates for Quality Development              | Chris Starker, Upstate Forever |
| Mike Abney, Duke Energy                                      | Sarah Kulpa, HDR               |
| Andrew Gleason, Foothills Trail Conservancy                  | Joe Dvorak, HDR                |
| Kelly Kirven, Kleinschmidt Assoc.                            | Jen Huff, HDR                  |
| Alison Jakupka, Kleinschmidt Assoc.                          | Kerry McCarney-Castle, HDR     |
| Rowdy Harris, SC Department of Parks, Recreation and Tourism | Eric Mularski, HDR             |

## Attendees (virtual)

Tristan Cleveland, LPDA

## Introduction

John Crutchfield welcomed participants in the room and online to the Bad Creek Relicensing Visual and Recreational Resources Committee meeting, briefly summarized the meeting agenda, provided a safety moment on heat-related issues, introduced the relicensing studies and study leads, and noted the meeting is being recorded. J. Crutchfield summarized the status of the relicensing efforts (ILP schedule) and showed the existing Project Boundary; he then handed the presentation over to Jen Huff to provide an update on the Visual Resources Study.

## Visual Resources Study Update

### Task 2 – Scene Area Analysis

J. Huff briefly summarized the tasks for the Visual Resources Study and introduced Duke Energy's subconsultant, Tristan Cleveland with LPDA. T. Cleveland provided a description of the scene area analysis, reviewed the objectives and methods used, and walked through slides showing different structures/features associated with Bad Creek II that would be visible from surrounding areas up to approximately 4 miles. For the new transmission line corridor, it was assumed the expanded corridor would parallel the existing line. The composite constructed project elements figure shows areas with views of multiple structures.

Chris Starker asked for clarification on adding the new transmission line, if the towers were proposed to be 130 feet tall, and if a new set of towers would be constructed adjacent to the existing towers. Sarah Kulpa indicated tower position and design are based on conservative measures based on available information. T. Cleveland indicated the existing corridor is 200 ft wide; the new one would result in widening the right-of-way from 200 ft to 380 ft.

Alan Stuart indicated many meeting attendees do not yet know of the proposed access road. J. Huff provided an overview of the purpose of the access road and A. Stuart stated it would be a temporary road to provide access to the Fishers Knob community and for first responder access to the station and community, further noting the road would be shut down and revegetated following project construction.

Rowdy Harris asked if the access road will be wide enough to get boat trailers through since residents of Fisher Knob leave boat trailers at the park. If the access road will be any narrower, it might cause more residents to leave their trailers at the park. A. Stuart indicated Duke Energy is still designing the road (no details available at this time).

William Wood asked if the current road would be blocked during construction. A. Stuart confirmed the current road would be restricted to Duke Energy use.

Andrew Gleason asked for confirmation that first responders/emergency vehicles would be able to traverse the access road/bridges. A. Stuart agreed that the road/bridges would support emergency vehicles of all types.

#### **Task 4 – Key Views Selection**

J. Huff described the objectives of Task 4 of the Visual Resources Study. As set forth in the approved study plan, the Resource Committee (RC) is to choose up to four Key Views that encompass a variety of potential scenic and visual impacts for the proposed project. Photos from the Key Views will be taken in leaf-off conditions (November). The goal for the meeting is to choose 6 potential Key Views today. Once the photos are available, the RC will meet again and narrow it down to 4 Key Views to use for the remaining tasks. J. Huff described the initial 11 potential key views that were identified based on the seen area analysis.

A Stuart indicated the locations of the key viewpoints will be determined by the stakeholders, not Duke Energy. J. Huff agreed and proposed the RC use a consensus process (i.e., everyone can live with the decision) to select the six views. Participants agreed. She then opened up the floor to the group to start the elimination process based on the 11 initial/proposed sites. The group decided to remove views 1A, 1B, 3 (from the water), 6, and 8.

A Gleason indicated there is a spot or two along a portion of the Foothills Trail immediately northwest of the Bad Creek Reservoir where the existing project is visible, however, he doesn't recommend adding any viewpoints and noted people like to look down at the reservoir from the trail.

Sue Williams asked about location of the Fisher Knob view and noted residents are likely used to the view of the inlet/outlet structure; leaf conditions are irrelevant.

Kelly Kirven asked about the handout that was provided and the closest feature in the viewshed. T. Cleveland indicated that just because it is listed as the closest view, it may not be the most prominent view, therefore, it is useful to look at individual viewshed maps (or composite map) to view all elements.

J. Huff noted that even though the consensus is to remove view 3 (looking upstream into Whitewater River cove), we would still include existing simulation of inlet/outlet portal (with leaf on) in report.

In November, six photos will be captured and a virtual meeting will be held (December) and at that time, the group will work together to narrow it down to four viewpoints for visualizations and simulations; Duke Energy will then carry out Tasks 7-9 based on the Visual Analysis with the report ready in 3<sup>rd</sup> quarter 2024.

A Stuart asked J. Huff where lighting effects come into play. J. Huff indicated the plan is still being developed but will likely involve the use of drones to capture baseline lighting (at the Project) and then will assess what is likely to be developed due to the addition of Bad Creek II. A. Stuart asked if it would be part of the report and J. Huff confirmed.

C. Starker agreed that lighting at nighttime is a concern and asked if there would be an update between now and November. J. Huff agreed to provide an update with one of the Recreational Resources updates.

## **Recreational Study**

K. Kirven provided an update for the Recreational Resources Study and overall tasks and objectives and the status of each task.

### **Task 1 Update**

The Foothills Trail (FHT) Corridor recreation site inventory was completed at seven sites on May 17, 2023, and on May 28, 2023, at four other sites. Two additional sites not specified in the RSP were included in the inventory (Coon Branch spur trail and Musterground Road). Traffic and trail counters were installed at Musterground Road in September 2022 and at access areas in May 2023. Due to issues with the counter at Musterground Road, Kleinschmidt will re-install the counter in September 2023. A few other counters did not function as intended over short periods of time, but Kleinschmidt will be able to extrapolate data from the larger survey.

In-person surveys began in March 2023; 155 were completed as of early July.

### **Task 2 Update**

FHT Corridor Conditions Assessment: Todd Branham (Long Cane Trails) began the assessment in June. He is using the Fulcrum app and is hiking the 43-mile portion of the trail in sections.

### **Task 3 Update**

Whitewater River Cove Existing Recreational Use Evaluation: This work is underway. Drone flights will occur 20 days over the season though Labor Day with hourly flights between 8am and 4pm on the hour.

### **Task 4 Update**

Has not started.

C. Starker asked about the survey response rate. K. Kirven stated the response rate is close to 100% because surveys are in person as opposed to sending them out and waiting for the survey to come back. A Stuart asked if Kleinschmidt is tracking the number of people who are asked to participate in the survey but decline; K. Kirven confirmed.

A. Gleason asked about trail counters being vandalized. K. Kirven indicated the one at Fisher Knob community has been stolen twice and the one at Chimneytop Gap on the trail has been stolen once (along with the post).

## **Action Items**

- HDR/Duke Energy will post meeting notes, the recording, and presentation to SharePoint site.
- HDR/Duke Energy to revise key views based on input received today.
- HDR/Duke Energy to provide an update on the lighting evaluation in a future Recreation Study progress report.

# Bad Creek Pumped Storage Project No. 2740

Recreation & Visual Resources  
Resource Committee Meeting



JULY 27, 2023

1

## Meeting Agenda

- Welcome and Meeting Purpose
- Safety Moment
- Introductions and FERC ILP Schedule
- Visual Resources Study
  - Task 2: Seen Area Analysis
  - Task 4: Key Views Selection
- Recreational Resources Study



Recreation & Visual Resources Resource Committee – July 27, 2023 | 2

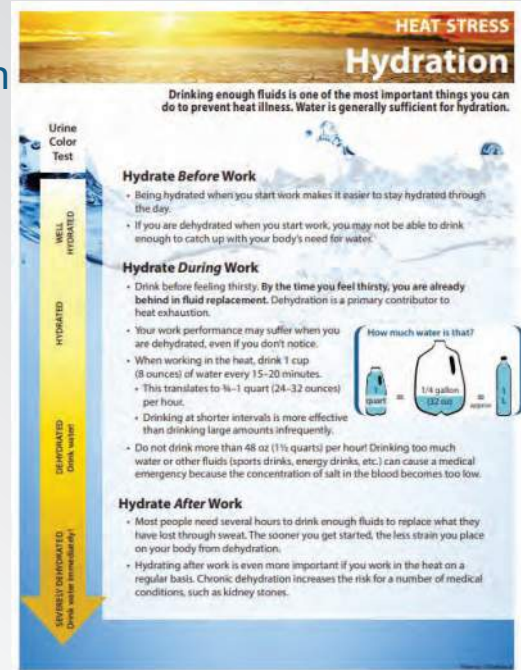
2

## Safety Moment – Heat Safety & Hydration

More than 700 Americans die from heat-related causes annually!

Steps to prevent heat stress

- Limit exposure (start early!)
- Pace yourself
- Loose, lightweight, light-colored clothing
- **Proper hydration**



Source: <https://www.cdc.gov/nceh/features/extremeheat/index.html>

Recreation & Visual Resources Resource Committee – July 27, 2023 | 3

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## FERC ILP Schedule

| Activity  | Responsible Parties   | Timeframe   | Estimated Filing Date or Deadline |
|---|-----------------------|---|-----------------------------------|
| File Notice of Intent (NOI) and Pre-application Document (PAD) (18 CFR §5.5(d)) | Licensee              | Within 5 years to 5.5 years prior to license expiration   | Feb 23, 2022                      |
| Initial Tribal Consultation Meeting (18 CFR §5.7)                               | FERC                  | No later than 30 days following filing of NOI/PAD   | Mar 25, 2022                      |
| Issue Notice of NOI/PAD and Scoping Document 1 (SD1) (18 CFR §5.8(a))           | FERC                  | Within 60 days following filing of NOI/PAD  | Apr 24, 2022                      |
| Conduct Scoping Meetings and site visit (18 CFR §5.8(b)(viii))                  | FERC                  | Within 30 days following Notice of NOI/PAD and SD1  | May 16-17, 2022                   |
| Comments on PAD, SD1, and Study Requests (18 CFR §5.9(a))                       | Licensee Stakeholders | Within 60 days following Notice of NOI/PAD and SD1  | June 23, 2022                     |
| Issue Scoping Document 2 (SD2) (18 CFR §5.10)                                   | FERC                  | Within 45 days following deadline for filing comments on PAD/SD1  | Aug 7, 2022                       |
| File Proposed Study Plan (PSP) (18 CFR §5.11)                                   | Licensee              | Within 45 days following deadline for filing comments on PAD/SD1  | Aug 7, 2022                       |
| PSP Meeting (18 CFR §5.11(e))   | Licensee              | Within 30 days following filing of PSP  | Sept 7, 2022                      |
| Comments on PSP (18 CFR §5.12)  | Stakeholders          | Within 90 days following filing of PSP  | Nov 5, 2022                       |
| File Revised Study Plan (RSP) (18 CFR §5.13(a))                                 | Licensee              | Within 30 days following deadline for comments on PSP   | Dec 5, 2022                       |
| Comments on RSP (18 CFR §5.13(b))   | Stakeholders          | Within 15 days following filing of RSP  | Dec 20, 2022                      |
| Issue Study Plan Determination (18 CFR §5.13(c))                                | FERC                  | Within 30 days following filing of RSP  | Jan 4, 2023                       |
| Conduct First Season of Studies (18 CFR §5.15)                                  | Licensee              | -   | Spring-Fall 2023                  |
| File Study Progress Reports (18 CFR §5.15(b))                                   | Licensee              | Quarterly   | Spring 2023 -Fall 2024            |
| File Initial Study Report (ISR) (18 CFR §5.15(c))                               | Licensee              | Pursuant to the Commission-approved study plan or no later than 1 year after Commission approval of the study plan, whichever comes first | Jan 4, 2024                       |

Recreation & Visual Resources Resource Committee – July 27, 2023 | 4

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## Recreation & Visual Resources Resource Committee

- Resource Committee Lead: Alan Stuart
- Lead Technical Manager: John Crutchfield
- Recreation Resources Study Lead: Kelly Kirven, Kleinschmidt Associates
- Visual Resources Study Lead: Jen Huff, HDR
- Visual Resources Landscape Architect: Tristan Cleveland, LPDA Associates



Recreation & Visual Resources Resource Committee – July 27, 2023 | 5

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## Visual Resources Study

### Task Refresher

- Task 1 – Existing Landscape Description
- **Task 2 – Seen Area Analysis**
- Task 3 – Field Investigation
- **Task 4 – Key Views Selection**
- Task 5 - Existing Visual Quality Assessment
- Task 6 – Visual Analysis
- Task 7 – Visual Management Consistency Review
- Task 8 – Mitigation Assessment
- Task 9 – Conceptual Design of Bad Creek II Complex



Recreation & Visual Resources Resource Committee – July 27, 2023 | 6

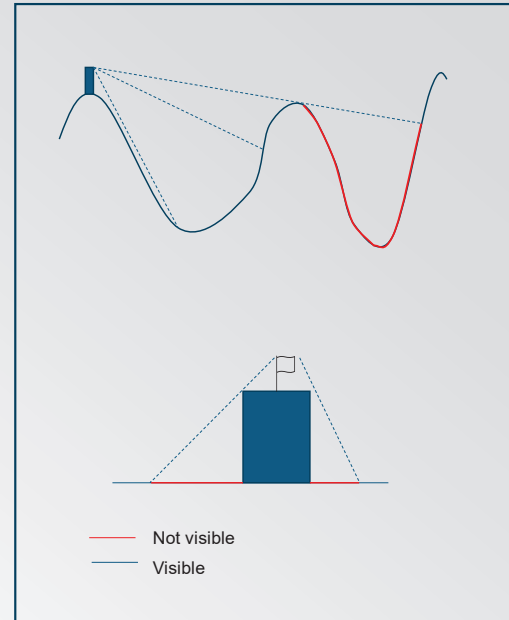
6

## Task 2 - Seen Area Analysis

**Objective:** Identify areas from which Bad Creek II would be visible

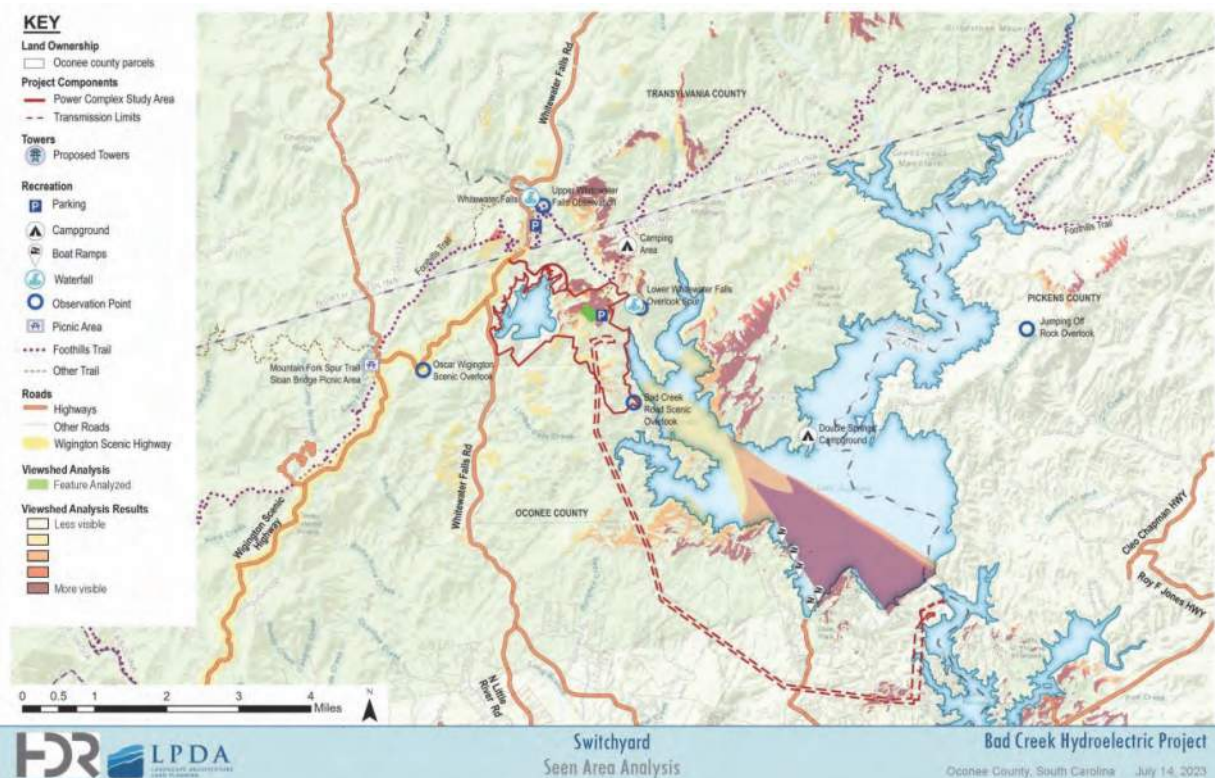
### Methodology:

- Geographic Information System (GIS): ESRI ArcGIS Pro Viewshed Analysis Spatial Analyst Tool
- USGS Digital Elevation Model (DEM)
- Conservative analysis
  - Bare earth basis (trees, structures)
  - Atmospheric effects (clouds, humidity, fog)
  - Revegetation of spoils area
  - Structure design

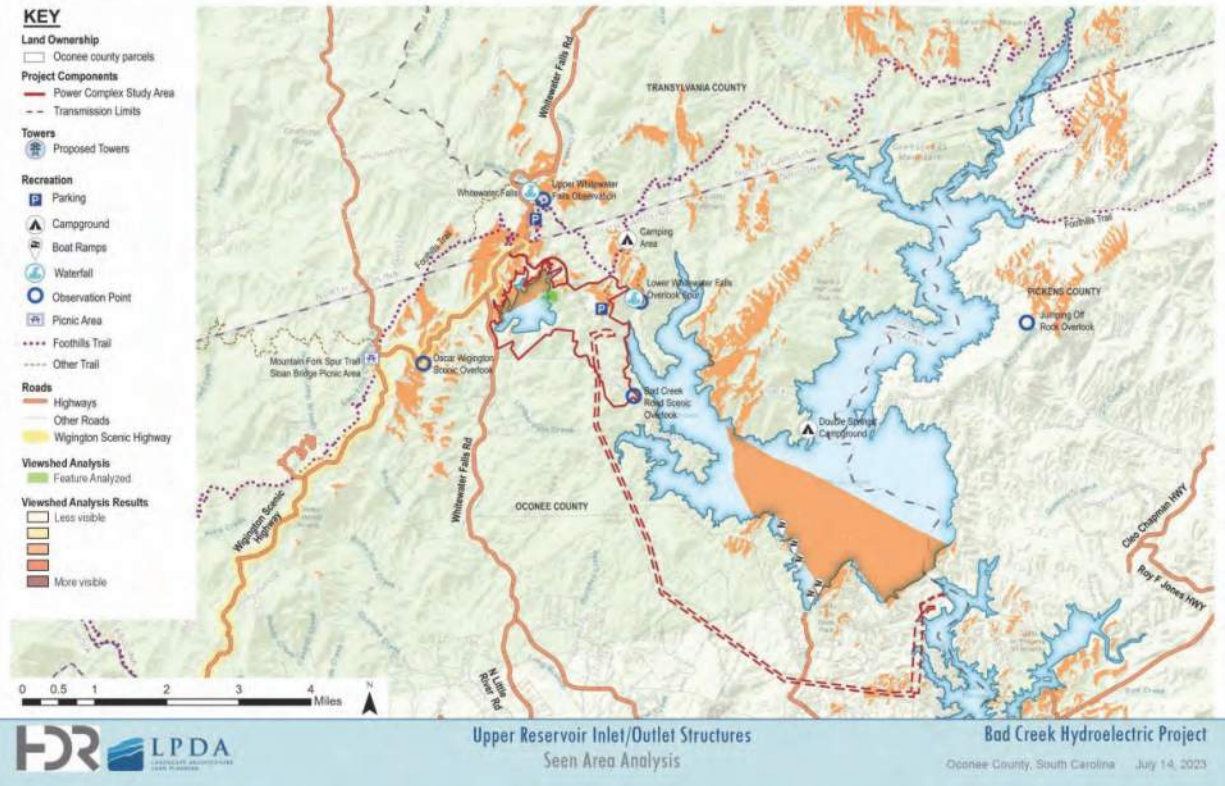


Recreation & Visual Resources Resource Committee – July 27, 2023 | 7

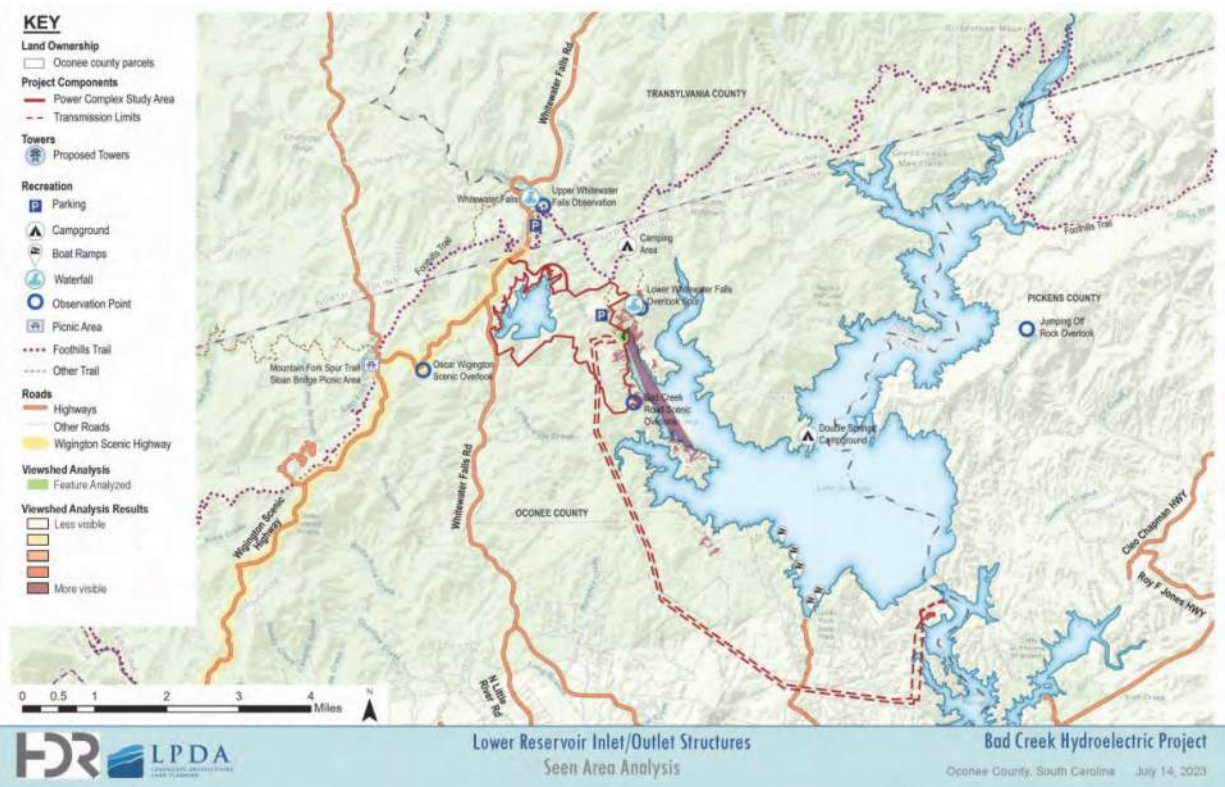
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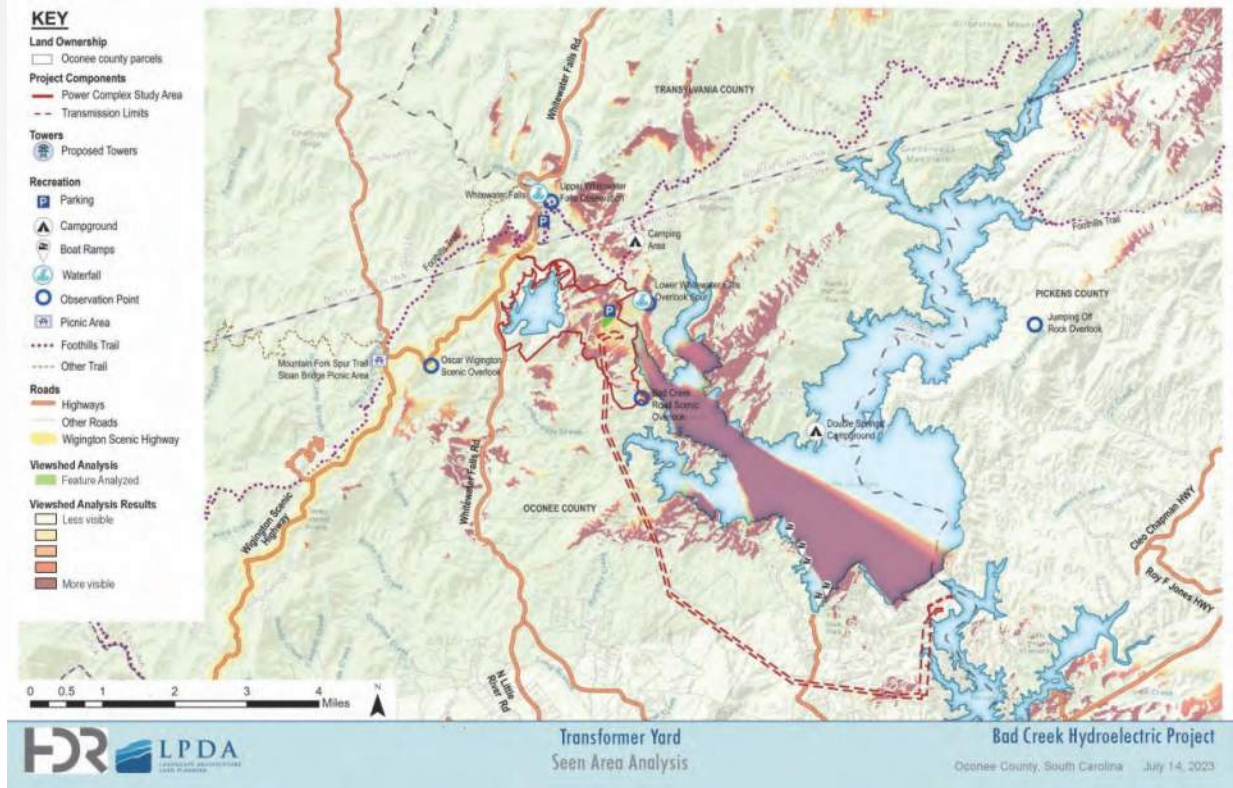
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9

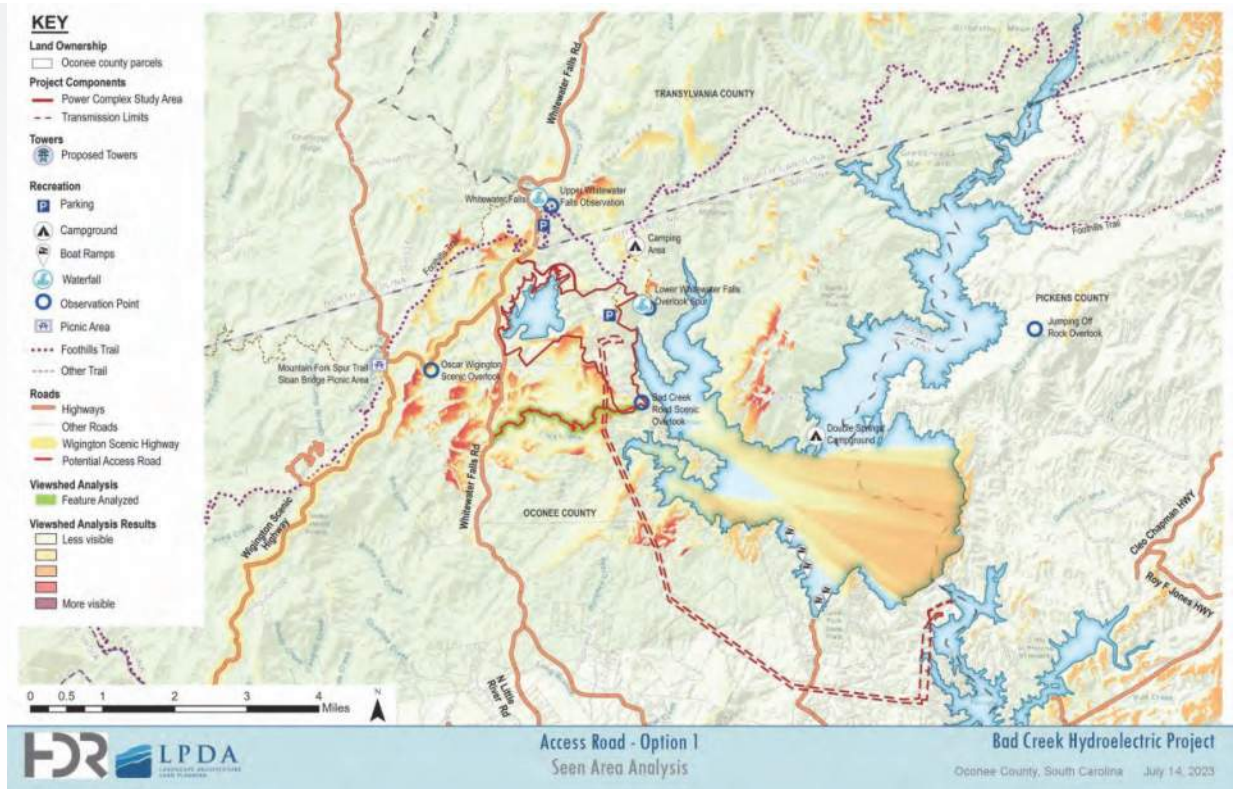


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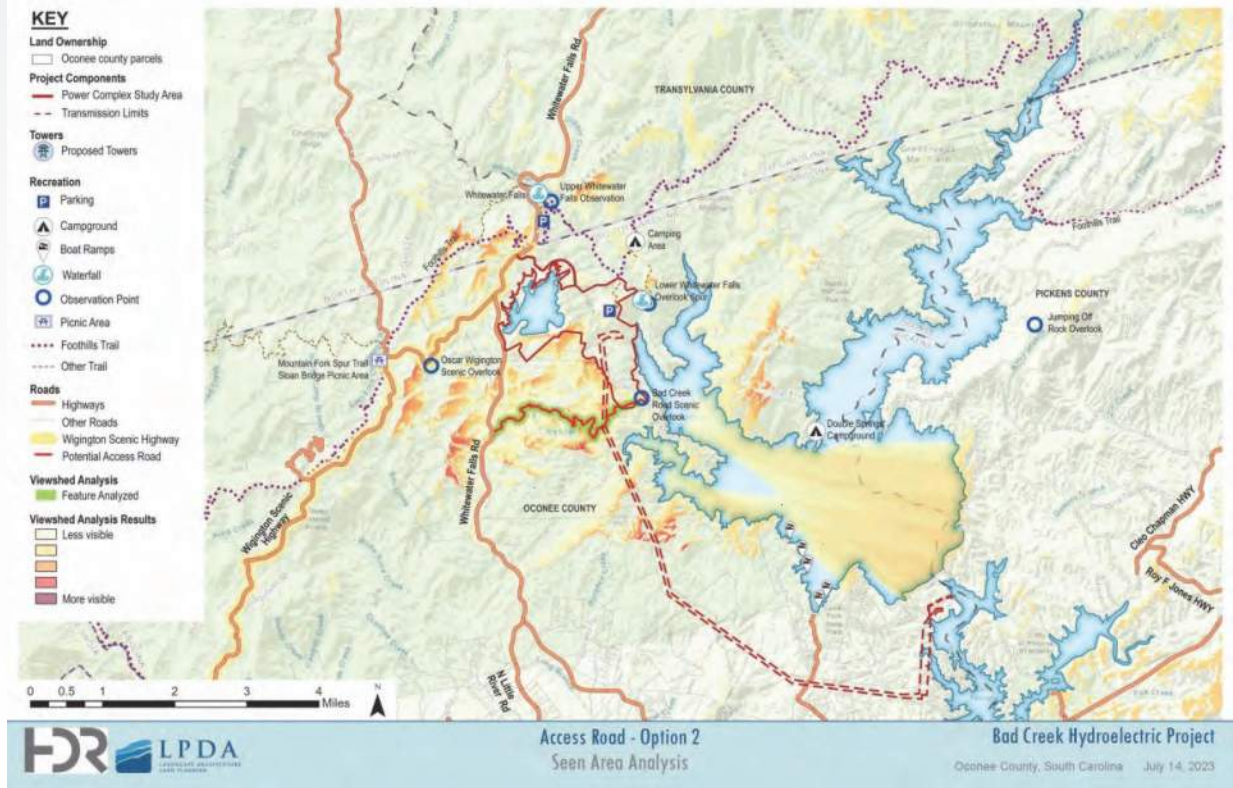
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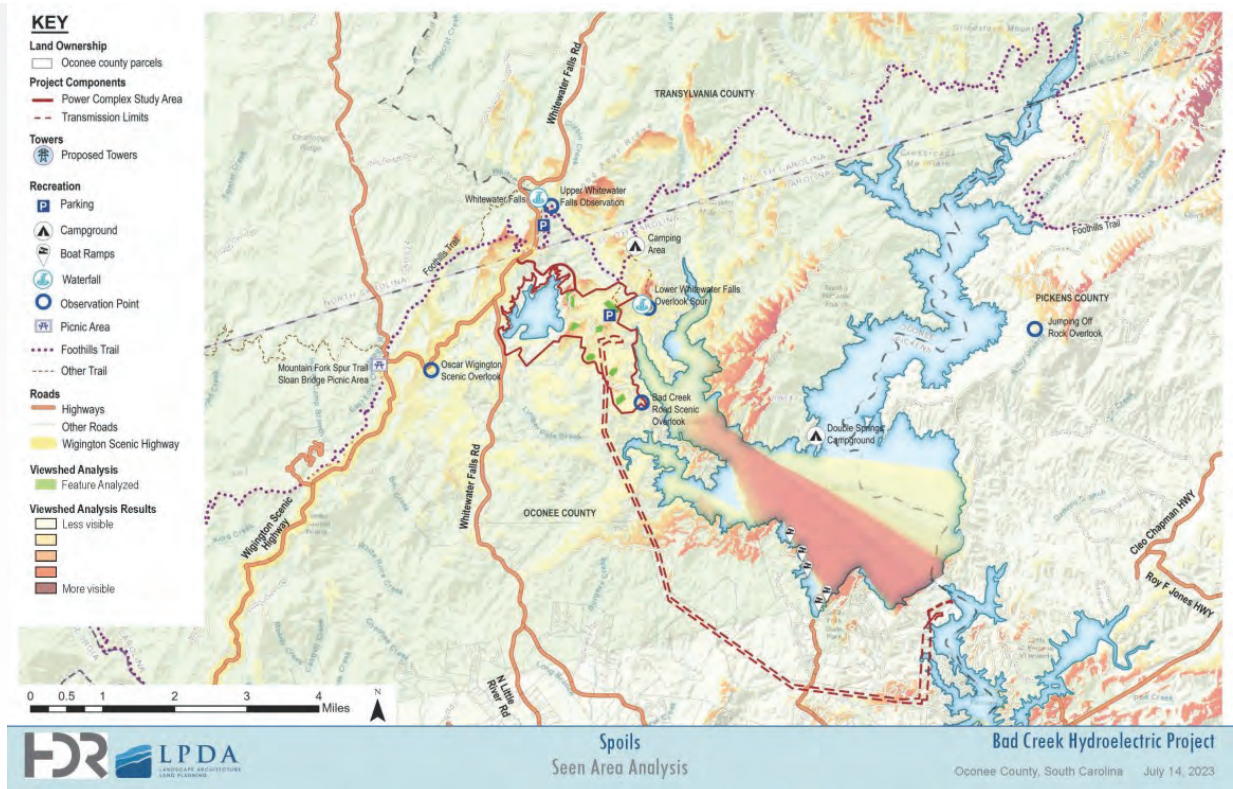
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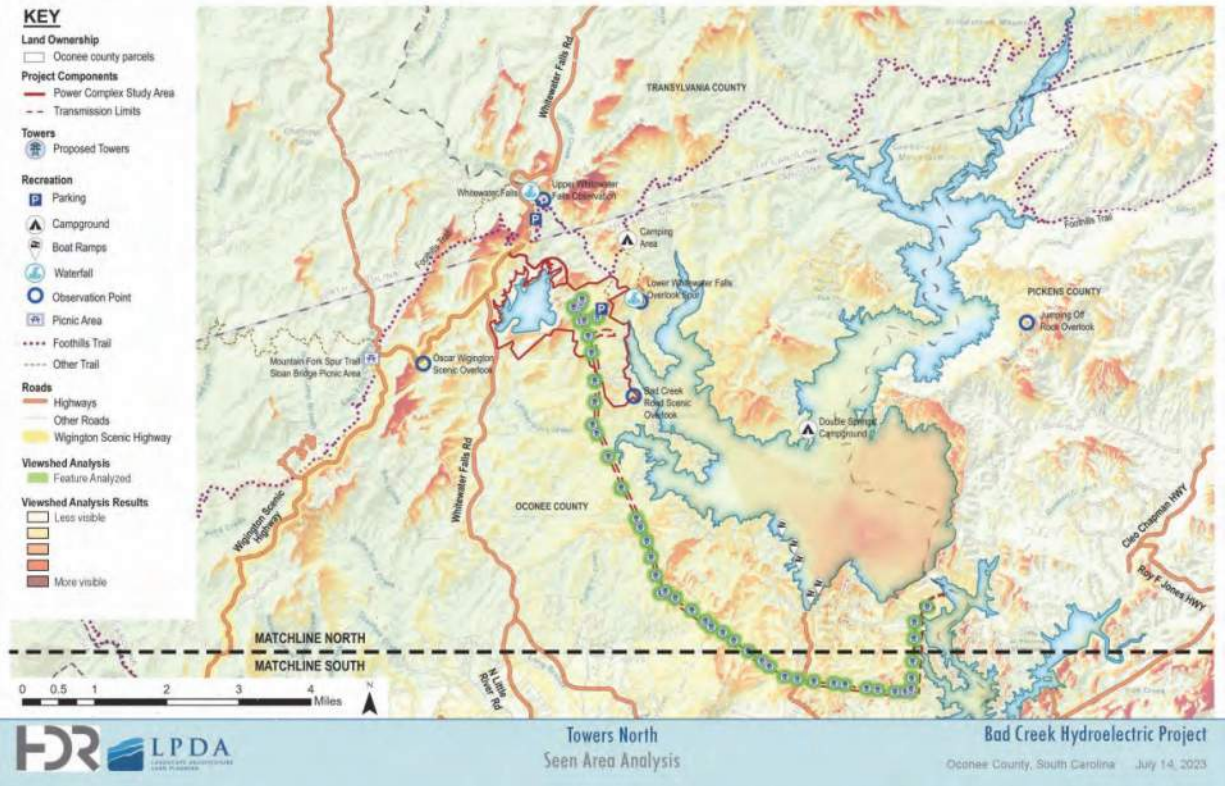
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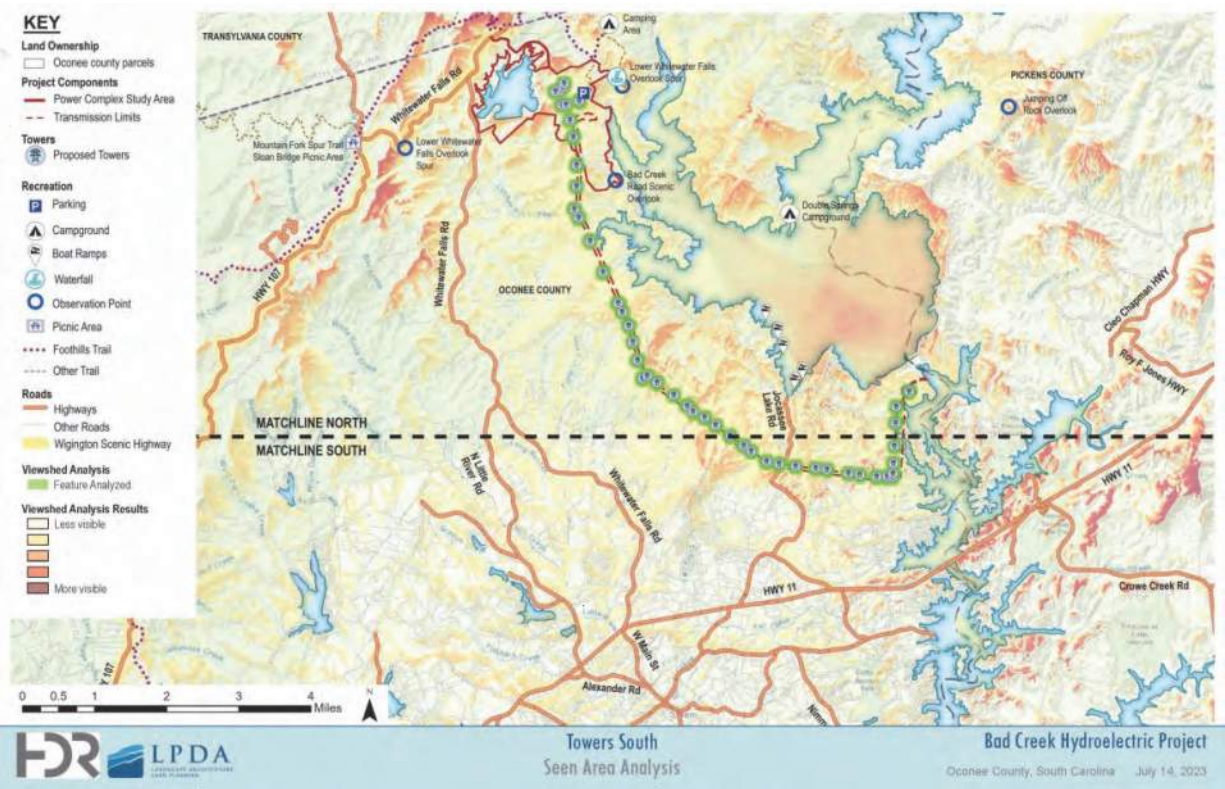
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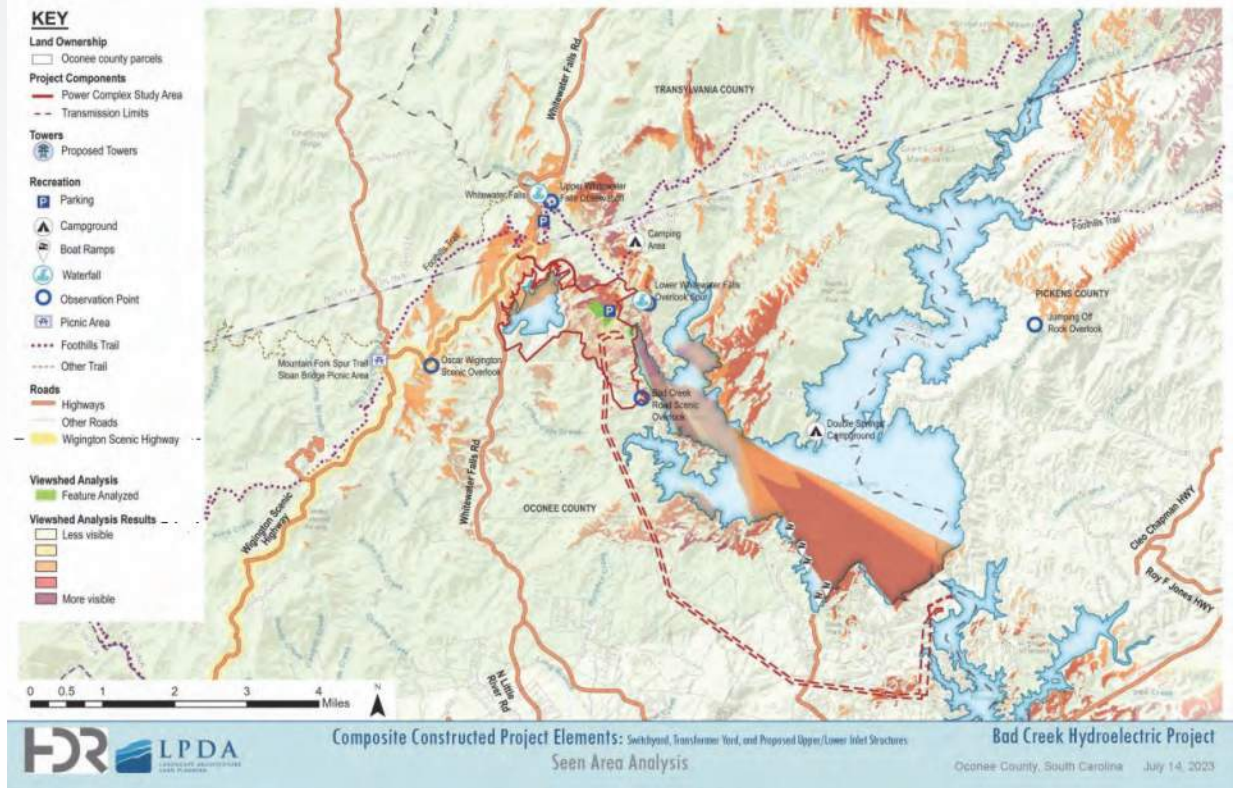
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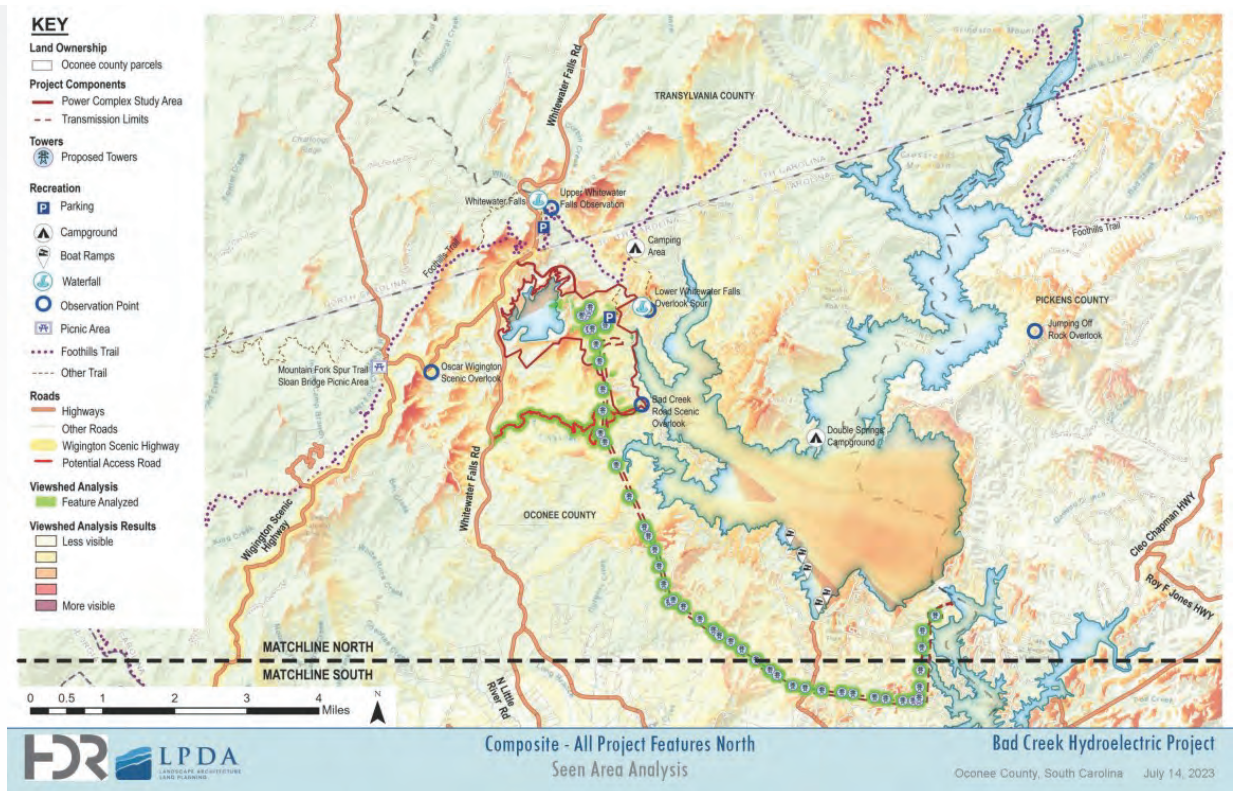


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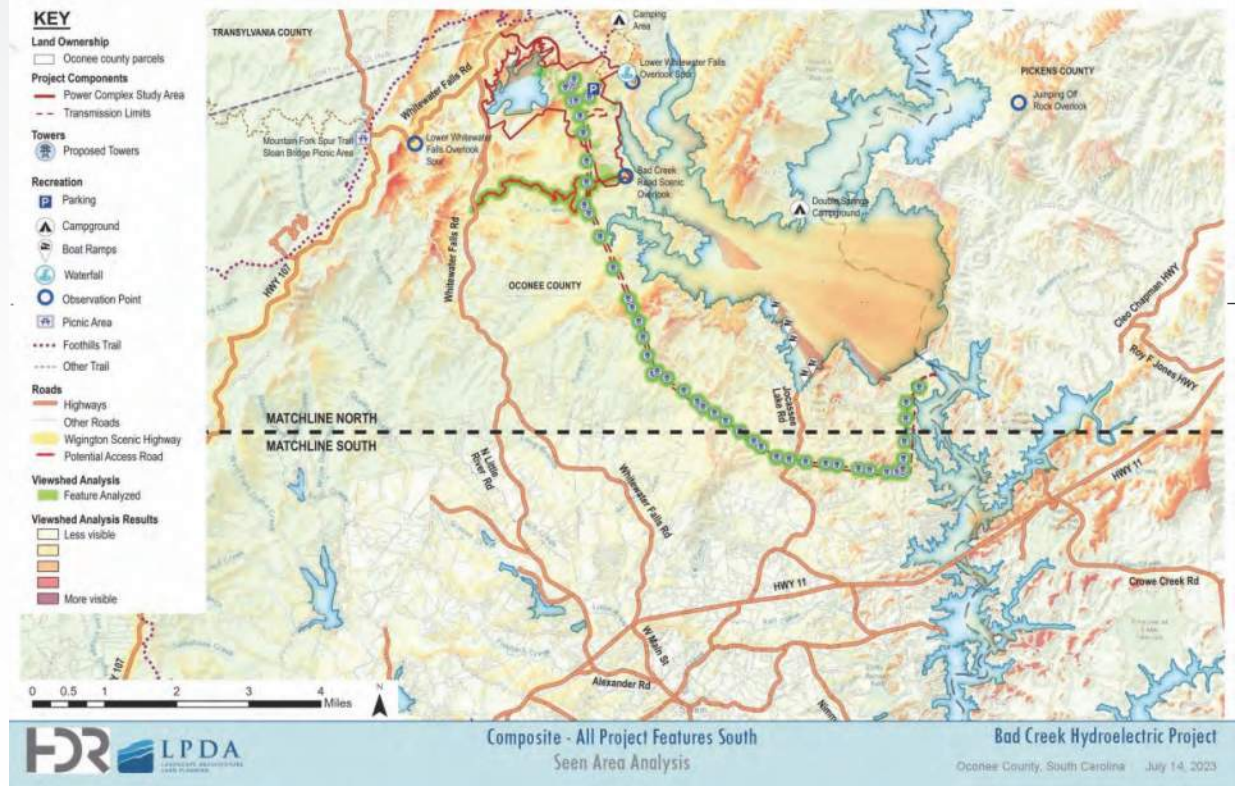
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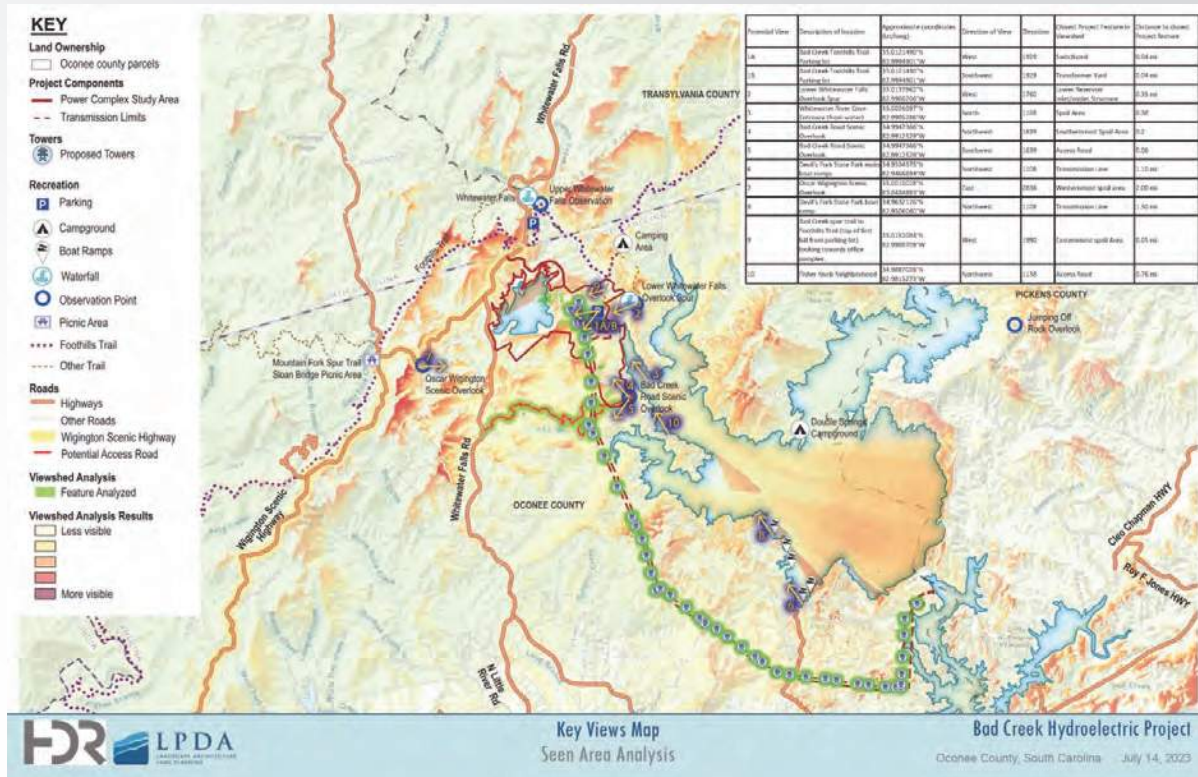
## Task 4 – Key Views Selection

“The objective will be to identify a set of Key Views (**up to four**) that adequately covers the range of visibility and potential scenic and visual impacts for the Project. Considerations that will be used in selecting specific Key Views **include viewing distance, to ensure adequate representation of potential foreground, middleground, and background views of the Project features; viewing direction; and the types of viewer groups** (typically including residents, recreational users and motorists) that might experience views of the Project facilities.”



Recreation &amp; Visual Resources Resource Committee – July 27, 2023 | 20

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## Potential Key Road Views

| Potential View | Description of location  | Approximate coordinates (lat/long) | Direction of View | Elevation | Closest Project Feature in Viewshed    | Distance to closest Project feature (mi) |
|----------------|--|------------------------------------|-------------------|-----------|--|--|
| 1A             | Bad Creek Foothills Trail Parking lot  | 35.0121490°N<br>82.9994901°W       | West              | 1929      | Switchyard                             | 0.04                                     |
| 1B             | Bad Creek Foothills Trail Parking lot  | 35.0121490°N<br>82.9994901°W       | Southwest         | 1929      | Transformer Yard                       | 0.04                                     |
| 2              | Lower Whitewater Falls Overlook Spur   | 35.0137962°N<br>82.9900206°W       | West              | 1760      | Lower Reservoir Inlet/outlet Structure | 0.35                                     |
| 3              | Whitewater River Cove Entrance (from water)  | 35.0026097°N<br>82.9905286°W       | North             | 1108      | Spoil Area                             | 0.38                                     |
| 4              | Bad Creek Road Scenic Overlook   | 34.9947366°N<br>82.9912529°W       | Northwest         | 1639      | Southernmost Spoil Area                | 0.20                                     |
| 5              | Bad Creek Road Scenic Overlook   | 34.9947366°N<br>82.9912529°W       | Southwest         | 1639      | Access Road                            | 0.06                                     |
| 6              | Devil's Fork State Park main boat ramps  | 34.9534575°N<br>82.9466694°W       | Northwest         | 1108      | Transmission Line                      | 1.10                                     |
| 7              | Oscar Wigington Scenic Overlook  | 35.0010028°N<br>83.0434883°W       | East              | 2836      | Westernmost spoil area                 | 2.00                                     |
| 8              | Devil's Fork State Park boat ramp  | 34.9632126°N<br>82.9506040°W       | Northwest         | 1108      | Transmission Line                      | 1.50                                     |
| 9              | Bad Creek spur trail to Foothills Trail (top of first hill from parking lot) looking towards office complex. | 35.0152084°N<br>82.9980709°W       | West              | 1990      | Easternmost spoil Area                 | 0.05                                     |
| 10             | Fisher Knob Neighborhood   | 34.9887026°N<br>82.9815273°W       | Northwest         | 1138      | Access Road                            | 0.76                                     |

Recreation &amp; Visual Resources Resource Committee – July 27, 2023 | 22

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## Key Views: Next Steps

- Task 3 – Field Investigation (November)
  - Capture views
  - Finalize Key Views (virtual meeting)
- Task 5 – Existing Visual Quality Assessment
- Task 6 – Visual Analysis
  - Develop visualizations
- Task 7 – Visual Management Consistency Review
- Task 8 – Mitigation Assessment
- Task 9 – Conceptual Design of Bad Creek II Complex
- Task 10 – Report (3<sup>rd</sup> quarter, 2024)



Recreation & Visual Resources Resource Committee – July 27, 2023 | 23

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## Recreation Resources Study



Recreation & Visual Resources Resource Committee – July 27, 2023 | 24

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## Recreation Resources Study - Task 1: Foothills Trail Corridor Recreation Use and Needs

### *Recreation Site Inventory*

The inventory was completed at the following sites on May 17, 2023:

- Sassafras Mountain Trail Access
- Chimney Top Gap Trail Access
- Laurel Valley Trail Access
- Lower Whitewater Falls Overlook
- Bad Creek Trail Access
- Coon Branch Spur Trail
- Musterground Road

The inventory was completed at the following sites on May 28, 2023:

- Laurel Fork Creek Falls Spur Trail Access
- Toxaway River Trail access
- Canebrake Trail Access
- Horsepasture River Trail Access

Recreation & Visual Resources Resource Committee – July 27, 2023 | 25

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## Recreation Resources Study - Task 1: Foothills Trail Corridor Recreation Use and Needs

### *Traffic and Trail Counts*

- Traffic and trail counters were installed at access areas in late February/early March 2023. The traffic counter at Musterground Road was installed in mid-September 2022.
  - Due to significant counter malfunctions, data was not collected at Musterground Road over a long period of time in fall 2022. Kleinschmidt will reinstall the traffic counter at Musterground Road by September 15, 2023, to ensure a complete dataset is collected between September 15 and January 15.



Recreation & Visual Resources Resource Committee – July 27, 2023 | 26

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## Recreation Resources Study - Task 1: Foothills Trail Corridor Recreation Use and Needs

### User Surveys

- In-person user surveys began in March 2023 at the Toxaway River Trail Access, the Horsepasture River Trail Access, the Bad Creek Hydro Trail Access, and the Laurel Valley Trail Access.

Number of surveys completed by recreation site and using the QR code through July 5, 2023

| Site Name                       | # Surveys Completed |
|---------------------------------|---------------------|
| Bad Creek Hydro Trail Access    | 44                  |
| Horsepasture River Trail Access | 13                  |
| Laurel Valley Trail Access      | 31                  |
| Toxaway River Trail Access      | 26                  |
| QR Code                         | 41                  |
| <b>Total</b>                    | <b>155</b>          |



Recreation & Visual Resources Resource Committee – July 27, 2023 | 27

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## Recreation Resources Study - Task 2: Foothills Trail Corridor Conditions Assessment

- Todd Branham (Long Cane Trails) began hiking the 43 miles of trail in late June and is collecting information using the Fulcrum app.

Foothills Trail Assessment

Date: June 17, 2023

Trail Name: Bad Creek Access Spur

Assessment's Name: 12

Site Marker: Bridge + Bridge

Assessment Type: 30' L x 5' W x 2' H

Measurements: Wooden bridge with handrails on both sides. Needs new bridge - old one completely gone

Photos:

Video:

Attachments:

Long Cane Trails  
PO Box 170  
Blount, NC 28610

Page 2 of 4  
ASSESSMENT-434364-17023

Foothills Trail Assessment

Bad Creek Access Spur, 12, Bridge + Bridge, 30' L x 5' W x 2' H

CREATED: 6/17/2023, 8:25:12 PM UTC  
By Todd Branham

UPDATED: 6/18/2023, 4:20:43 PM UTC  
By Todd Branham

STATUS: Needs Repair

LOCATION: 35.224866, -82.729478

Long Cane Trails  
PO Box 170  
Blount, NC 28610

Page 1 of 2  
ASSESSMENT-434364-17023

Recreation & Visual Resources Resource Committee – July 27, 2023 | 28

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## Recreation Resources Study - Task 3: Whitewater Cove Existing Recreational Use Evaluation

### Drone Flight Summary at Whitewater River Cove

| Date   | # of Images Collected | ~ High Temp (°F) | Notes                                   |
|--------|-----------------------|------------------|---|
| 28-May | 49                    | 63 °F            |   |
| 31-May | 40                    | 75 °F            |   |
| 2-Jun  | 93                    | 86 °F            |   |
| 3-Jun  | 69                    | 88 °F            |   |
| 13-Jun | 49                    | 79 °F            |   |
| 24-Jun | 105                   | 82 °F            |   |
| 28-Jun | 80                    | 89 °F            |   |
| 1-Jul  | 102                   | 93 °F            |   |
| 4-Jul  | 105                   | 89 °F            |   |
| 14-Jul | 74                    | 92 °F            | Due to lightning, flights ended at 2:30 |
| 15-Jul | 83                    | 95 °F            | Due to storms, flights ended at 3:00    |

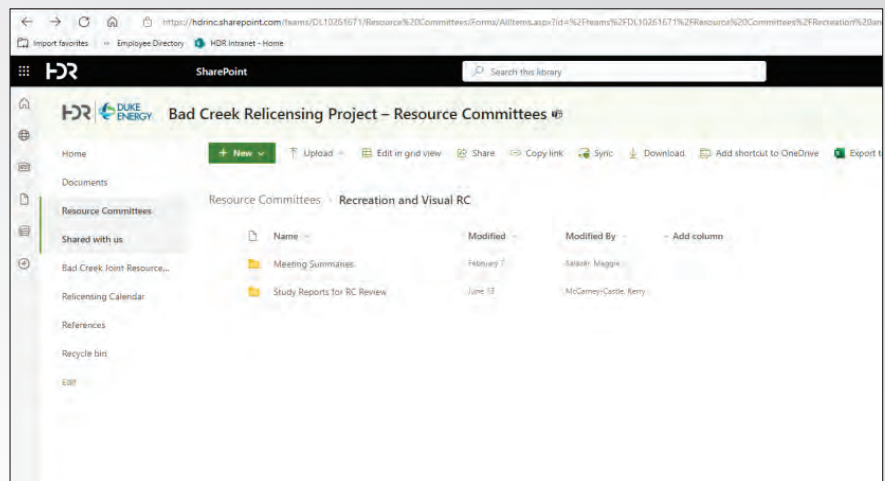


Recreation & Visual Resources Resource Committee – July 27, 2023 | 29

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## Closing Remarks

- Action item review
- Meeting summary



Recreation & Visual Resources Resource Committee – July 27, 2023 | 30

30



---

**From:** maggie.salazar@hdrinc.com  
**Subject:** FW: Bad Creek Relicensing - Visual Resources Lighting Evaluation Study  
**Attachments:** potential night views.pdf  
  
**Importance:** High

---

**From:** Crutchfield Jr., John U <John.Crutchfield@duke-energy.com>  
**Sent:** Wednesday, October 11, 2023 8:15 AM  
**To:** Amy Breedlove <BreedloveA@dnr.sc.gov>; Andrew Gleason <andrewandwilla@hotmail.com>; Andy Douglas <adoug41@att.net>; Chris Starker <cstarker@upstateforever.org>; Dale Wilde <dwilde@keoweefolks.org>; RankinD <RankinD@dnr.sc.gov>; Elizabeth Miller <MillerE@dnr.sc.gov>; Kelly Kirven <Kelly.Kirven@KleinschmidtGroup.com>; Ken Forrester <forresterk@dnr.sc.gov>; quattrol <quattrol@dnr.sc.gov>; Salazar, Maggie <maggie.salazar@hdrinc.com>; Amedee, Morgan D. <amedeemd@dhec.sc.gov>; cloningerp@dnr.sc.gov; SelfR <SelfR@dnr.sc.gov>; Rowdy Harris <charris@scprt.com>; Stuart, Alan Witten <Alan.Stuart@duke-energy.com>; suewilliams130@gmail.com; William T. Wood <woodw@dnr.sc.gov>; Willie Simmons <simmons@dnr.sc.gov>; Huff, Jen <Jen.Huff@hdrinc.com>; phil.mitchell@gmail.com; Bill Ranson-Retired <bill.ranson@retiree.furman.edu>  
**Cc:** Kulpa, Sarah <sarah.kulpa@hdrinc.com>; McCarney-Castle, Kerry <kerry.mccarney-castle@hdrinc.com>  
**Subject:** Bad Creek Relicensing - Visual Resources Lighting Evaluation Study  
**Importance:** High

**CAUTION: [EXTERNAL]** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Bad Creek Relicensing Recreation & Visual Resources Committee Members:

Per discussion during the July 27, 2023 Resource Committee meeting, please find attached the proposal for the lighting evaluation component of Task 9 (Conceptual Design of Bad Creek II Complex) for the Bad Creek Visual Resources Study.

Duke Energy is planning to use a similar process to plan for collecting images and developing visualizations of Project features for use with Task 4 (Key Views Selection). We are focused on two categories of views for the lighting evaluation: near and distance views. The near views will have a clear view of the facility while the distant views will be focused on evaluating the effects of additional facility lighting on the surrounding landscape.

Similar to the process we will use for the daytime views, we will provide the four (4) images to the Resource Committee for them to select two (2) that will then be used for visualizations. In selecting the four views, we focused on areas that are likely to have nighttime use and potentially already experience some sort of lighting effects. The four views we are proposing are:

- View from the Bad Creek Foothills Trail parking lot
- View from the top of the first hill on the spur trail from the parking lot to the Foothills Trail
- View from a dock at Fishers Knob looking towards the site. Note the location of this site is dependent on gaining homeowner agreement from a resident on Fishers Knob.
- View from the northernmost boat ramp at Devils Fork State Park looking towards the site

The attached drawing shows the approximate locations.

We will capture nighttime images that are representative of the viewer experience (as opposed to longer exposure or enhanced visibility images). We are targeting a moon phase of quarter moon to half-moon in November, so we are likely

looking at the last week of November – weather permitting. We will plan to capture the daytime and nighttime images on the same day.

Please provide comments to me regarding the above proposal by **October 27, 2023**. If you have questions, please reach out to me or Jen Huff at [Jen.Huff@hdrinc.com](mailto:Jen.Huff@hdrinc.com).

Regards,

***John Crutchfield***

Project Manager II

Water Strategy, Hydro Licensing & Lake Services

Regulated & Renewable Energy

Duke Energy

525 South Tryon Street, DEP-35B | Charlotte, NC 28202

Office 980-373-2288 | Cell 919-757-1095

KEY

- Land Ownership**
- Oconee county parcels
- Project Components**
- Power Complex Study Area
  - Transmission Limits

- Towers**
- Proposed Towers

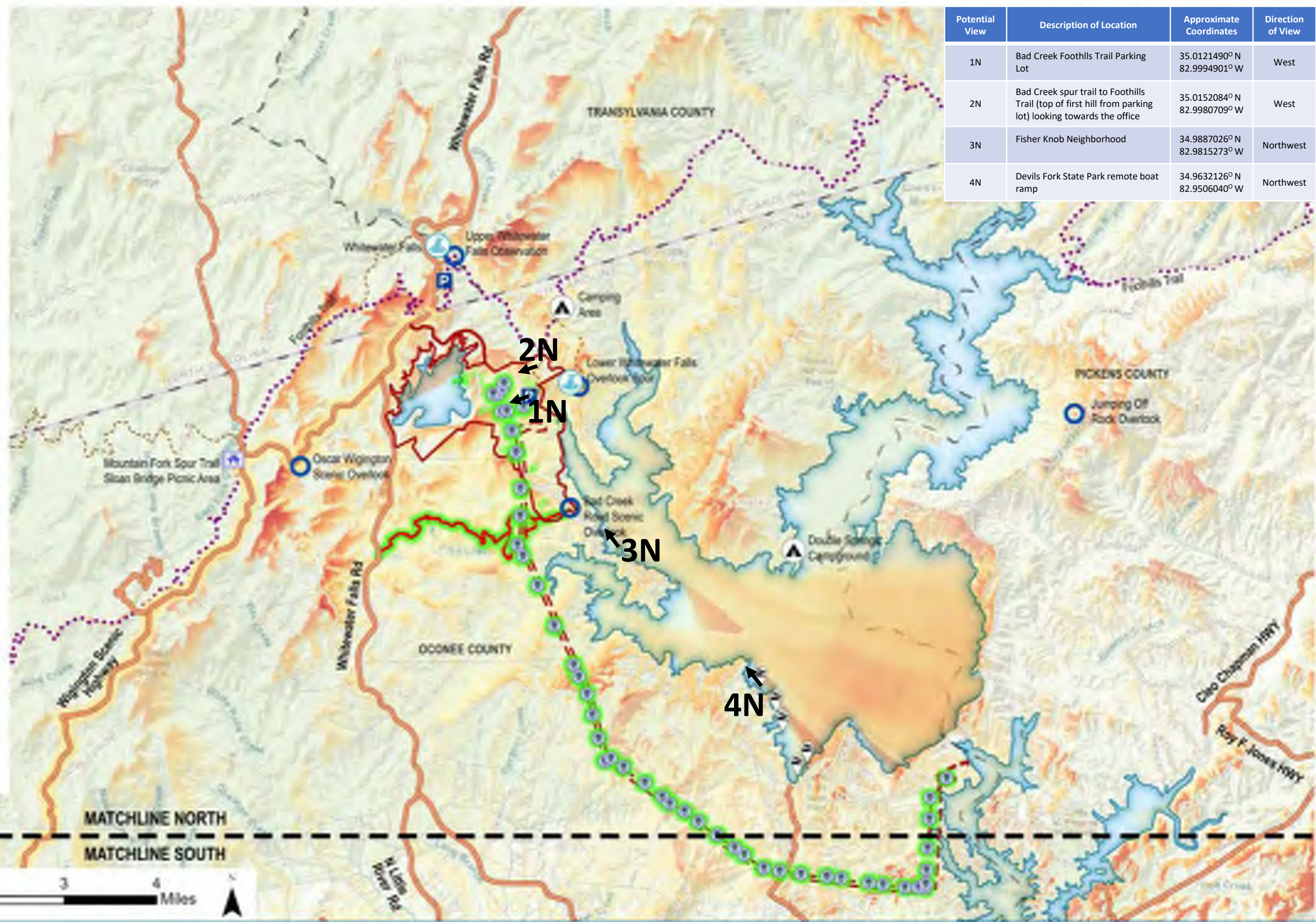
- Recreation**
- Parking
  - Campground
  - Boat Ramps
  - Waterfall
  - Observation Point
  - Picnic Area
  - Foothills Trail
  - Other Trail

- Roads**
- Highways
  - Other Roads
  - Wigington Scenic Highway
  - Potential Access Road

- Viewshed Analysis**
- Feature Analyzed

- Viewshed Analysis Results**
- Less visible
  - More visible

| Potential View | Description of Location   | Approximate Coordinates        | Direction of View |
|----------------|---|--------------------------------|-------------------|
| 1N             | Bad Creek Foothills Trail Parking Lot   | 35.0121490° N<br>82.9994901° W | West              |
| 2N             | Bad Creek spur trail to Foothills Trail (top of first hill from parking lot) looking towards the office | 35.0152084° N<br>82.9980709° W | West              |
| 3N             | Fisher Knob Neighborhood  | 34.9887026° N<br>82.9815273° W | Northwest         |
| 4N             | Devils Fork State Park remote boat ramp   | 34.9632126° N<br>82.9506040° W | Northwest         |



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**From:** [Crutchfield Jr., John U](#)  
**To:** [Stuart, Alan Witten](#); [Huff, Jen](#); [Kulpa, Sarah](#); [McCarney-Castle, Kerry](#)  
**Subject:** FW: [EXTERNAL] Re: Bad Creek Relicensing - Visual Resources Lighting Evaluation Study  
**Date:** Tuesday, October 17, 2023 6:26:23 AM

---

**CAUTION:** [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

FYI.

---

**From:** Dale Wilde <[dwilde@keoweefolks.org](mailto:dwilde@keoweefolks.org)>  
**Sent:** Tuesday, October 17, 2023 3:58 AM  
**To:** Crutchfield Jr., John U <[John.Crutchfield@duke-energy.com](mailto:John.Crutchfield@duke-energy.com)>  
**Subject:** [EXTERNAL] Re: Bad Creek Relicensing - Visual Resources Lighting Evaluation Study

**\*\*\* CAUTION! EXTERNAL SENDER \*\*\* STOP. ASSESS. VERIFY!!** Were you expecting this email? Are grammar and spelling correct? Does the content make sense? Can you verify the sender? If suspicious report it, then do not click links, open attachments or enter your ID or password.

John,

FOLKS has no comments on this lighting evaluation study.

Ms. Dale Wilde  
President, FOLKS  
C: 207-604-6539  
E: [dwilde@keoweefolks.org](mailto:dwilde@keoweefolks.org)

"Friends of Lake Keowee Society is dedicated to the preservation and enhancement of Lake Keowee and its watershed through advocacy, conservation, and education."

On Oct 11, 2023, at 8:15 AM, Crutchfield Jr., John U <[John.Crutchfield@duke-energy.com](mailto:John.Crutchfield@duke-energy.com)> wrote:

Dear Bad Creek Relicensing Recreation & Visual Resources Committee Members:

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Please provide comments to me regarding the above proposal by **October 27, 2023**. If you have questions, please reach out to me or Jen Huff at [Jen.Huff@hdrinc.com](mailto:Jen.Huff@hdrinc.com).

Regards,

***John Crutchfield***

Project Manager II

Water Strategy, Hydro Licensing & Lake Services

Regulated & Renewable Energy

Duke Energy

525 South Tryon Street, DEP-35B | Charlotte, NC 28202

Office 980-373-2288 | Cell 919-757-1095

<potential night views.pdf>

**From:** [Crutchfield Jr., John U](#)  
**To:** [Amy Breedlove](#); [Andrew Gleason](#); [Andy Douglas](#); [Chris Starker](#); [Dale Wilde](#); [RankinD](#); [Elizabeth Miller](#); [Kelly Kirven](#); [Ken Forrester](#); [quattrol](#); [Salazar, Maggie](#); [Amedee, Morgan D.](#); [Pat Cloninger](#); [SelfR](#); [Rowdy Harris](#); [Stuart, Alan Witten](#); [suewilliams130@gmail.com](#); [William T. Wood](#); [Willie Simmons](#); [Huff, Jen](#)  
**Cc:** [Kulpa, Sarah](#); [McCarney-Castle, Kerry](#); [Settevendemio, Erin](#)  
**Subject:** Bad Creek Relicensing - Visual Resources Committee Virtual Meeting for View Selection Analysis  
**Date:** Tuesday, December 5, 2023 1:22:48 PM  
**Importance:** High

---

**CAUTION:** [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Bad Creek Relicensing Recreation and Visual Resources Committee Members:

Please recall that the Visual Resources Study called for Duke Energy's relicensing consultant, HDR, to capture photographs at six locations in the vicinity of the site during leaf-off conditions. That has now been done, so the next step in the process is for the Recreation and Visual Resources Resource Committee to select four of the six locations, plus two nighttime views, to use for the remaining study tasks. That includes the development of photo simulations of Bad Creek II and an analysis of the effects of the expanded facility on the surrounding landscape.

Duke Energy would like to convene the Resource Committee via a Teams virtual meeting to provide input and gain consensus on the view site selection. We will convene the meeting during the week of January 8-12, 2024, and the meeting will be scheduled for 2 hours, either in the morning (9-11 am) or afternoon (1-3 pm).

Please use the Doodle Poll link below to provide your availability to attend this virtual meeting.

<https://doodle.com/meeting/participate/id/elvBZwjb>

I would appreciate if you would respond to the Doodle Poll meeting availability by no later than Friday, December 15, COB.

I will schedule the Teams meeting via Outlook calendar soon after the Doodle Poll closes.

Regards,

**John Crutchfield**

Project Manager II  
Water Strategy, Hydro Licensing & Lake Services  
Regulated & Renewable Energy  
Duke Energy  
525 South Tryon Street, DEP-35B | Charlotte, NC 28202  
Office 980-373-2288 | Cell 919-757-1095

# Bad Creek Relicensing - Visual Resources Committee Virtual Meeting for View Selection Analysis

Friday, December 29, 2023 10:57 AM

**Meeting Date:** 1/11/2024 9:00 AM

**Location:** Microsoft Teams Meeting

**Link to Outlook Item:** [click here](#)

## Invitation Message

**CAUTION:** [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Bad Creek Relicensing Recreation and Visual Resources Committee Members:

Please recall that the Visual Resources Study called for Duke Energy's relicensing consultant, HDR, to capture photographs at six locations in the vicinity of the site during leaf-off conditions. That has now been done, so the next step in the process is for the Recreation and Visual Resources Resource Committee to select four of the six locations, plus two nighttime views, to use for the remaining study tasks. That includes the development of photo simulations of Bad Creek II and an analysis of the effects of the expanded facility on the surrounding landscape.

Duke Energy would like to convene the Resource Committee via a Teams virtual meeting to provide input and gain consensus on the view site selection.

An agenda will be provided for the meeting.

Please contact John Crutchfield if you have any questions regarding the meeting.

---

## Microsoft Teams meeting

**Join on your computer, mobile app or room device**

[Click here to join the meeting](#)

Meeting ID: 215 178 507 820

Passcode: Cf6udk

[Download Teams](#) | [Join on the web](#)

**Join with a video conferencing device**

duke-energy@m.webex.com

Video Conference ID: 115 636 987 4

[Alternate VTC instructions](#)

**Or call in (audio only)**

[+1 704-659-4701,,981740090#](#) United States, Charlotte

Phone Conference ID: 981 740 090#

[Find a local number](#) | [Reset PIN](#)

[Learn More](#) | [Help](#) | [Meeting options](#)

---

## Participants

 [Crutchfield Jr., John U](#) (Meeting Organizer)

 Amy Breedlove

 Andrew Gleason

- ☐ Andy Douglas
- ☐ Chris Starker
- ☐ Dale Wilde
- ☐ Dan Rankin
- ☐ Elizabeth Miller
- ☐ Kelly Kirven
- ☐ Ken Forrester
- ☐ quattrol
- ☐ [Salazar, Maggie](#)
- ☐ Amedee, Morgan D.
- ☐ Pat Cloninger
- ☐ SelfR
- ☐ Rowdy Harris
- ☐ Stuart, Alan Witten
- ☐ suewilliams130@gmail.com
- ☐ William T. Wood
- ☐ [Willie Simmons](#)
- ☐ [Huff, Jen](#)
- ☐ [Kulpa, Sarah](#)
- ☐ [McCarney-Castle, Kerry](#)

**From:** [Crutchfield Jr., John U](#)  
**To:** [Amy Breedlove](#); [Andrew Gleason](#); [Andy Douglas](#); [Chris Starker](#); [Dale Wilde](#); [Dan Rankin](#); [Elizabeth Miller](#); [Kelly Kirven](#); [Ken Forrester](#); [quattrol](#); [Salazar, Maggie](#); [Amedee, Morgan D.](#); [Pat Cloninger](#); [SelfR](#); [Rowdy Harris](#); [Stuart, Alan Witten](#); [suewilliams130@gmail.com](#); [William T. Wood](#); [Willie Simmons](#); [Huff, Jen](#)  
**Cc:** [Kulpa, Sarah](#); [McCarney-Castle, Kerry](#)  
**Subject:** Bad Creek Relicensing-Recreation & Visual Resources Committee Meeting Materials (1/11/2024 Meeting)  
**Date:** Tuesday, January 16, 2024 11:41:27 AM  
**Attachments:** [2024 01 11 rec rc mtg summary.pdf](#)  
**Importance:** High

---

**CAUTION:** [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Bad Creek Relicensing Recreation & Visual Resources Committee Members:

Please find attached the summary of Visual Resources Study meeting held on January 11, 2024. I have also included below the SharePoint link to access the meeting summary, PowerPoint presentation, and the recorded Teams meeting.

[Bad Creek Relicensing Project – Resource Committees - 2024 01 11 Rec RC Mtg - All Documents \(sharepoint.com\)](#)

For those who attended the meeting, please review the meeting summary, and let me know if you have any comments or edits by Friday, February 2 (COB).

Please let Alan or me know if you have any questions about the meeting materials.

Regards,

**John Crutchfield**

Project Manager II

Water Strategy, Hydro Licensing & Lake Services

Regulated & Renewable Energy

Duke Energy

525 South Tryon Street, DEP-35B | Charlotte, NC 28202

Office 980-373-2288 | Cell 919-757-1095

# Meeting Minutes

|            |   |                             |  |
|------------|---|-----------------------------|--|
| Project:   | Bad Creek Relicensing                           |                             |  |
| Subject:   | Visual Resources Meeting for Key View Selection |                             |  |
| Date:      | Thursday, January 11, 2024                      |                             |  |
| Location:  | Microsoft Teams                                 |                             |  |
| Attendees: | Sue Williams – AQD                              | Jen Huff – HDR              |  |
|            | Alan Stuart – Duke Energy                       | Kerry McCarney-Castle – HDR |  |
|            | John Crutchfield – Duke Energy                  | James Lane - HDR            |  |
|            | Andrew Gleason – Foothills Trail Conservancy    |                             |  |
|            | Amy Chastain – SCDNR                            |                             |  |
|            | Chris Starker – Upstate Forever                 |                             |  |

## Introduction

John Crutchfield opened the meeting at 9:00 am and let folks know the meeting would be recorded for those who could not be in attendance as well as for future reference. He asked for objections; no one objected. Duke Energy will make available the meeting summary, PowerPoint presentation, and recording on the SharePoint site in the next couple of weeks.

J. Crutchfield reviewed the agenda and purpose of meeting. As a reminder, six potential Key Observation Points (KOPs) were agreed upon during the Visual Resources meeting in July 2023. The purpose of today's meeting is for the Visual Resources committee to choose four (out of the six originally agreed upon) KOPs based on photos captured during leaf-off conditions in November 2023 (not yet seen by the Recreation & Visual Resources Resource Committee [RC]) and to obtain input and consensus for selection of the nighttime views for photo rendering.

Safety Moment (J. Crutchfield) – Cold Stress

## KOP Selection

Jen Huff provided a refresher on the Seen Area Analysis and potential KOPs from the July 2023 meeting in Greenville, SC. At that meeting, it was decided the KOP3 photo (from Whitewater River cove) would not be re-collected since the photo rendering is already complete for the additional inlet/outlet associated with Bad Creek II. Six potential KOPs were identified during the July Resource Committee meeting. Selected KOPs will be used to complete the remaining Visual Resources Study tasks.

KOP Selection (Task 4) and Field Work (Task 3) – J. Huff showed a map of locations where images were collected and explained necessary location changes (i.e., decisions made in the field based on field conditions/views/best professional judgement). Changes included:

- Elimination of potential KOP5 at the Bad Creek Visitor Overlook. The intention of the view was to capture the transmission line, but only an extremely limited view was observable.
- Elimination of potential KOP 9: KOP 9 was intended to capture a view of the office/warehouse complex from the Bad Creek spur trail. However, no views were observed, so the field crew moved the view to potential KOP 11.
- Addition of potential KOP 11: Given the elimination of KOP 9, the crew first evaluated adding a potential KOP at the parking lot trailhead. However, upon further consideration, the field crew elected to capture a view from potential KOP 11 at the entrance to Musterground Road which captured the most effect.

Field work was done on 12/6/2023 during leaf-off conditions. HDR photographer collected 24mm and 50mm views in the daytime (10 am - 1:30 pm) under sunny with scattered clouds and windy conditions and nighttime (6 pm – 9:30 pm) with clear, calm conditions. The nighttime views were collected prior to moonrise, and it was fully dark during image collection for nighttime views. J. Huff showed a series of images of the potential KOPs:

1. **KOP2:** Lower Whitewater Falls overlook toward Bad Creek, 24mm and 50mm views. Some project facilities were visible but not noticeable. Would likely not be able to see any facilities during leaf-on conditions.
2. **KOP4:** Bad Creek Visitor Overlook near the split rail fence , 24mm and 50mm views. Inlet/outlet structure visible.
3. **KOP7:** Oscar Wigginton Overlook, 24mm and 50mm views. Portions of transmission line visible.
4. **KOP10a:** View from privately-owned dock at Fisher Knob, 24 mm and 50 mm views. Closest private dock to inlet/outlet structure; inlet/outlet portal visible.
5. **KOP10b:** View from privately-owned residence at Fisher Knob, 24 mm and 50 mm views. Homeowner's yard from point where land juts out into Whitewater River Cove. Inlet/outlet structure visible more clearly.
6. **KOP11:** Entrance to Musterground Road near the Foothills Trail information kiosk (added in-field), 24 mm view. View of open field with warehouse and Duke Energy office building; open field will be future location of new transmission line switchyard.

J. Huff opened the floor to discussion and led meeting participants through the process of choosing four out of the six potential KOPs to retain for the study. Jen said the selection would be through consensus of the RC, i.e., the committee members could live with the selected KOPs.

Sue Williams asked if the transmission line (new) will follow the existing transmission line. J. Huff answered yes, that is correct. S. Williams indicated there may not be much value from the Oscar Wigginton Overlook (KOP7) for transmission line views since it would be the basically the same view.

Chris Starker countered it might be worth keeping the power line views at Oscar Wigginton (KOP7) since the existing transmission corridor is 200 feet wide and will be expanded to nearly

380 feet. Widening the corridor could change the view, even though the transmission lines would follow the existing lines.

C. Starker stated KOP11 (Musterground Road kiosk) may not be useful since it is a parking lot and not an area of recreation, though the new transmission line switchyard at that site may have the effect of making the area feel more industrial and recreators may feel less secure.

J. Huff asked about removing KOPs10a and 10b. C. Starker asked for confirmation if both KOPs are homeowner views and noted the concern is more for the public, not for private property owners (who already experience the view). Amy Chastain stated that KOP10b would be useful to keep from a boating standpoint, as that is the view one sees when entering Whitewater River Cove via boat. Alan Stuart agreed that the 10a and 10b views were from the water views so may be important to keep at least one of them.

A. Chastain also suggested removing KOP11 since it is a parking lot, and a switchyard likely wouldn't deter visitors from hiking.

J. Huff reminded the group photo simulations were already done from the water for KOP3, which was taken from the Whitewater River Cove.

J. Huff asked for RC consensus on keeping photo simulations for KOP2. The RC agreed.

C. Starker noted that with leaf-on conditions, one wouldn't normally see anything as long as there is a healthy canopy (persistent) in place. The photo from Oscar Wiggington Overlook may be important from that standpoint because that canopy would need to be maintained (cut).

Andrew Gleason stated in his opinion, KOP11 (Musterground Parking lot) could be dropped from further evaluation, given the area will be closed off during construction. J. Huff reminded the group that the open field would have a switchyard for the life of the project.

J. Huff noted while they were on-site collecting images, two other cars accessed the Bad Creek Visitors Overlook, therefore, it is regularly used (KOP4). The RC reached consensus on keeping KOP4.

J. Huff returned to KOPs10a and 10b and reminded the group about KOP3. Sue Williams favors 10b to keep. Group consensus to eliminate KOP10a.

**KOP Selection Final Consensus:** Eliminate KOP11 (Musterground Road entrance) and KOP10a (homeowner dock). Retain KOPs 2, 4, 7, 10b, and existing KOP3.

## Lighting Evaluation

Nighttime views were collected December 6, 2023. J. Huff showed map of locations where images were collected and noted changes that were made in the field based on view/field conditions/best professional judgement. Nighttime photography was challenging – collecting nighttime views are difficult because it's necessary to use long photographic exposures. While HDR's photographer (James Lane) is experienced in nighttime photography, some exposures led to lighter views (in photos) than what was experienced in the field.

J. Huff indicated there were two views where neither the Project nor light associated with it were visible at all – the top of Jocassee Dam and Devil's Fork State Park at the remote boat launch area. C. Starker asked about not seeing lights at certain views and that the concern is that additional light would be added from Bad Creek II. J. Huff indicated for photo simulations, Duke Energy would be replicating the current amount of light to represent Bad Creek II (and when there is nothing but darkness, only darkness could be replicated).

**Photo 1N:** View from the entrance to Musterground Road.

**Photo 3N(a):** View from Fisher Knob homeowner site (KOP10a); can see lights of the inlet/outlet structure.f

**Photo 3N(b):** View from Fisher Knob homeowner (3Nb); can see lights from inlet/outlet as well as existing transformer yard on top of the hill.

A. Stuart asked about faint visible light to the north of ridge (north of the Project) above the ridge crest in the 3N(b) photos since there is no city nearby. J. Huff noted that faint light near ridgetops is an artifact of the long photographic exposure.

J. Huff asked if there would be interest / value in seeing a photo simulation of the future switchyard at night from location 1N. C. Starker agreed there would be interest and asked if it would be very illuminated at night. J. Huff said no, the switchyard would have some security lights but would not be brightly lit.

J. Huff noted 3Nb might be the best (at the 24mm) image to use as it shows the view from a boat on Whitewater River Cove. A. Chastain agrees as does S. Williams. C. Starker asked if 3Na and 3Nb are the same view. Jen replied 3N(a) is from the dock closest to the intake/outlet and the other is further out on the point at Fisher Knob. C. Starker asked what nighttime would look like from either of the overlooks. J. Huff indicated photos were not collected from the overlooks because it is assumed that people don't view vistas in the dark.

**Nighttime Lighting Final Consensus:** 1N and 3nb (24mm)

## Next Steps

Tasks 5-10 will be completed, and the Visual Resources Study Report will be distributed for RC review during the second quarter of this year (2024).

C. Starker asked if anybody is aware of astronomy clubs that use these areas. A. Gleason responded he is aware of the Roper Mountain Astronomy Club, but they use Sassafras Mountain which is east of Lake Jocassee. A. Stuart is not aware of any and he had asked the same question. J. Huff is not familiar with folks doing night hikes or visiting the site for star gazing but will look into it. A. Gleason noted he was not aware of any activities at Bad Creek.

J. Huff reiterated the meeting summary, recording, and presentation would be made available via the SharePoint Site. J. Crutchfield thanked everybody for their input and adjourned the meeting at 9:50 am.

# Bad Creek Pumped Storage Project No. 2740

Visual Resources Study -  
Recreation & Visual Resources  
Resource Committee



JANUARY 11, 2024

1

## Meeting Agenda

- Welcome and Meeting Purpose
- Safety Moment
- Introductions
- Visual Resources Study Refresher
  - Task 2: Seen Area Analysis
  - Task 4: Potential Key Views Selection
- Key Views Selection
  - Daytime Key Observation Points
  - Lighting Effects
- Next Steps & Schedule



Visual Resources Study – January 11, 2024 | 2

2

## Safety Moment – Cold Stress

- Know the symptoms of cold stress.
- Monitor your physical condition and that of others.
- Take regular breaks to warm up when needed.
- Dress properly for the cold.
  - At least 3 layers!
  - Tight clothing reduces blood circulation to the extremities.
- Stay dry in the cold. Moisture or dampness, including sweating, can increase the rate of heat loss from the body.
- Keep extra clothing (including underwear) handy in case you get wet and need to change.
- Drink warm sweetened fluids (no alcohol).
- Include chemical hot packs in your first aid kit.
- Avoid touching cold metal or wet surfaces with bare skin.

| Condition   | Symptoms   |  |
|-------------|--|--|
| Hypothermia | <b>Early Symptoms</b>  | <b>Late Symptoms</b>   |
|             | <ul style="list-style-type: none"> <li>• Shivering</li> <li>• Fatigue</li> <li>• Loss of coordination</li> <li>• Confusion, disorientation</li> </ul>            | <ul style="list-style-type: none"> <li>• No shivering</li> <li>• Blue skin</li> <li>• Dilated pupils</li> <li>• Slowed pulse and breathing</li> <li>• Loss of consciousness</li> </ul> |
| Frostbite   | <ul style="list-style-type: none"> <li>• Reduced blood flow to hands, feet</li> <li>• Numbness</li> </ul>  | <ul style="list-style-type: none"> <li>• Aching</li> <li>• Tingling or stinging</li> <li>• Bluish or pale, waxy skin</li> </ul>  |
| Trench Foot | <ul style="list-style-type: none"> <li>• Reddening of the skin</li> <li>• Numbness</li> <li>• Leg cramps</li> <li>• Swelling</li> <li>• Tingling pain</li> </ul> | <ul style="list-style-type: none"> <li>• Blisters, ulcers</li> <li>• Bleeding under the skin</li> <li>• Gangrene (foot may turn dark purple, blue, or gray)</li> </ul>                 |
| Chillblains | <ul style="list-style-type: none"> <li>• Redness</li> <li>• Itching</li> <li>• Possible blistering</li> </ul>  | <ul style="list-style-type: none"> <li>• Inflammation</li> <li>• Possible ulceration in severe cases</li> </ul>  |

Source: <https://www.cdc.gov/niosh/docs/2010-115/pdfs/2010-115.pdf>

Visual Resources Study – January 11, 2024 | 3

3

## Visual Resources Study Refresher

- Seen Area Analysis
- Potential Key Observation Points (KOP) selected (July 27, 2023)
  - KOP 3 decision
  - Task 5: Existing landscape quality and characteristics (near foreground, foreground, midground, background)
  - Task 6: Proposed landscape described based on the photosimulation
  - Task 7: Consistency of proposed features with management goals and plans
  - Task 8: Mitigation recommendations to address significant differences between existing & proposed conditions
- Lighting Evaluation Photo Points (October 11, 2023)



4

## Task 4: KOP Selection



5

## Task 3: Fieldwork

- December 6, 2023
- Leaf-off conditions
- 24mm and 50 mm
- Daytime
  - 10:00 am – 1:30 pm
  - Sunny with scattered clouds, windy
- Evening
  - 6:00 pm – 9:30 pm
  - Clear, calm, moonrise after midnight

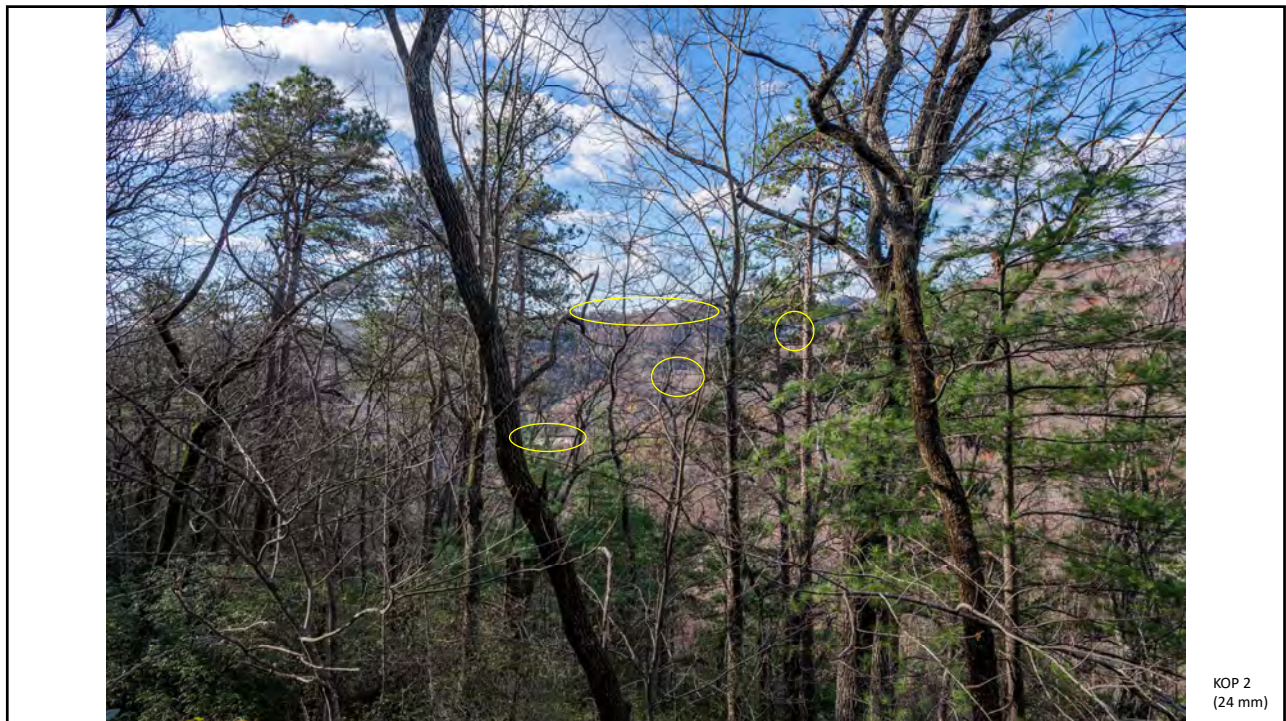


Visual Resources Study – January 11, 2024 | 6

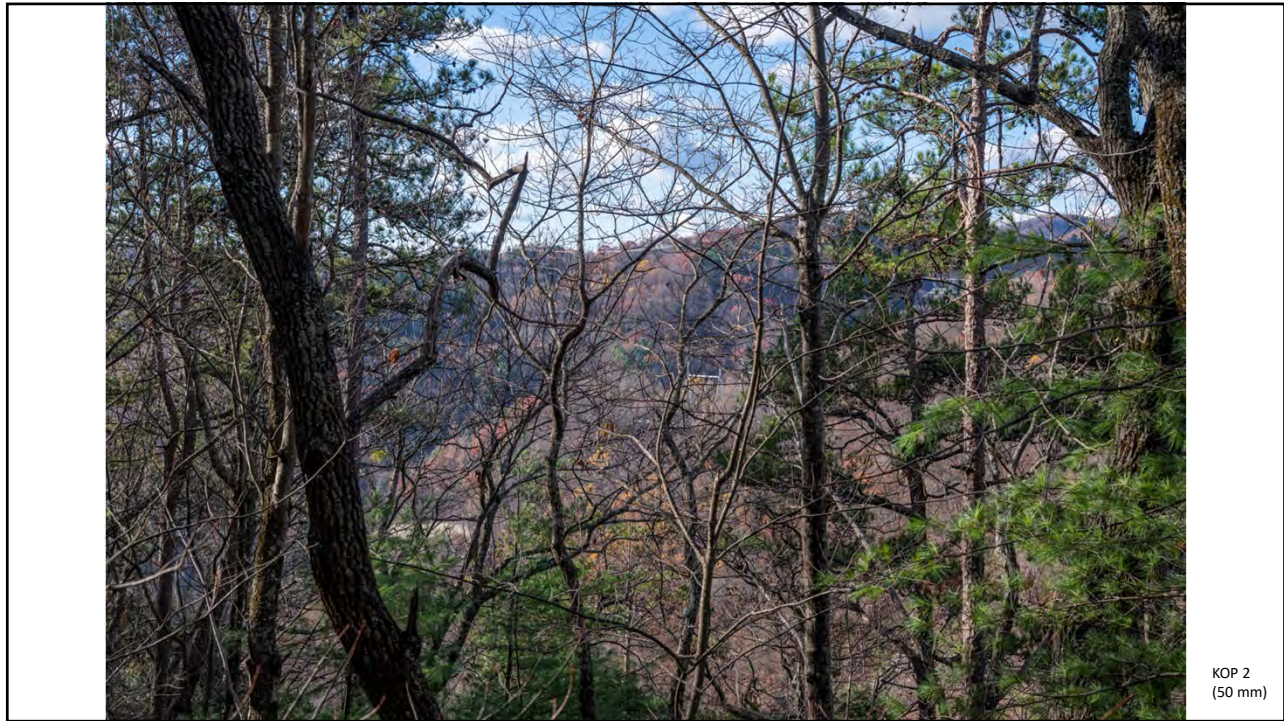
6



7



8



9



10



11



12



13



14



15



16



17



18

Goal: Select No More than 4!



2



4



7



10a



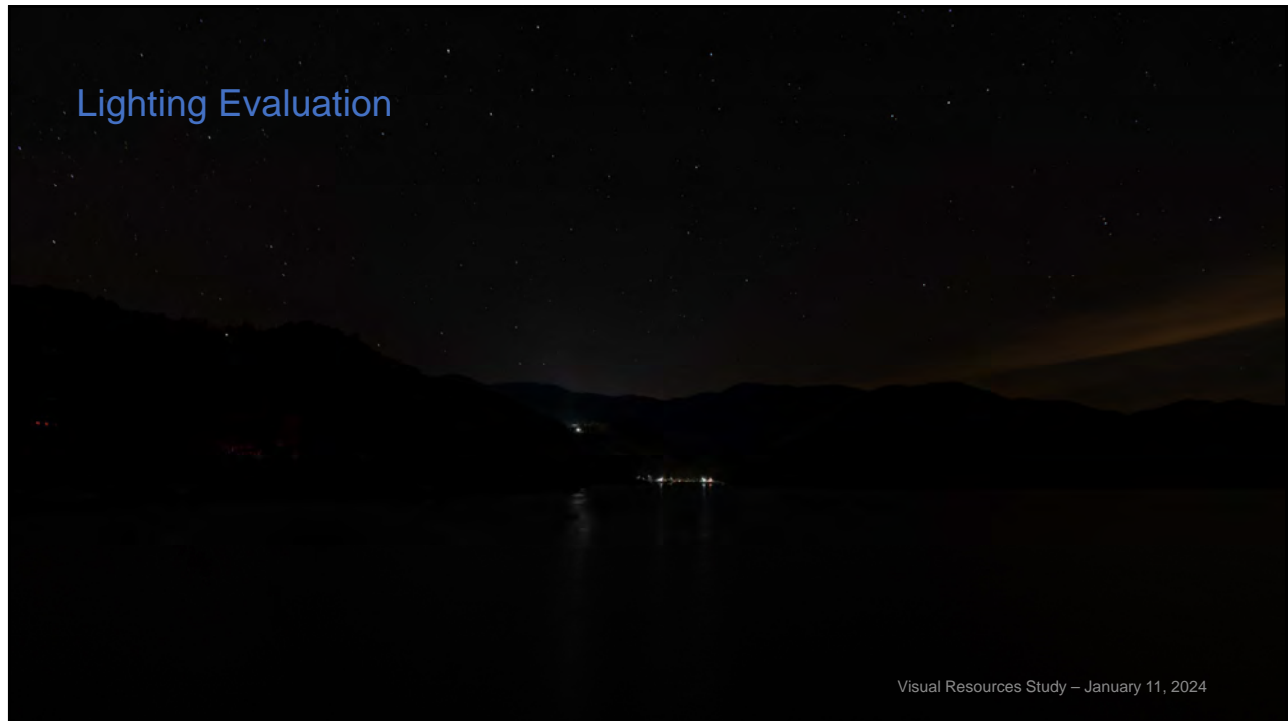
10b



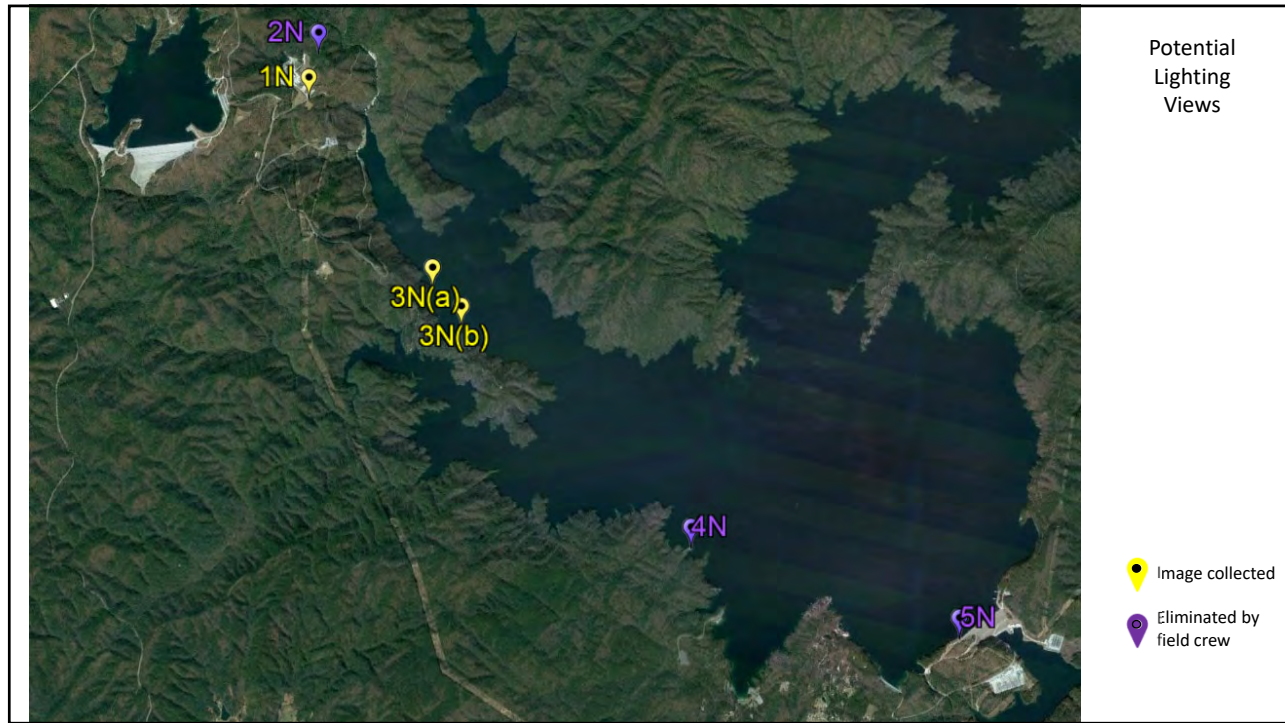
11

19

## Lighting Evaluation



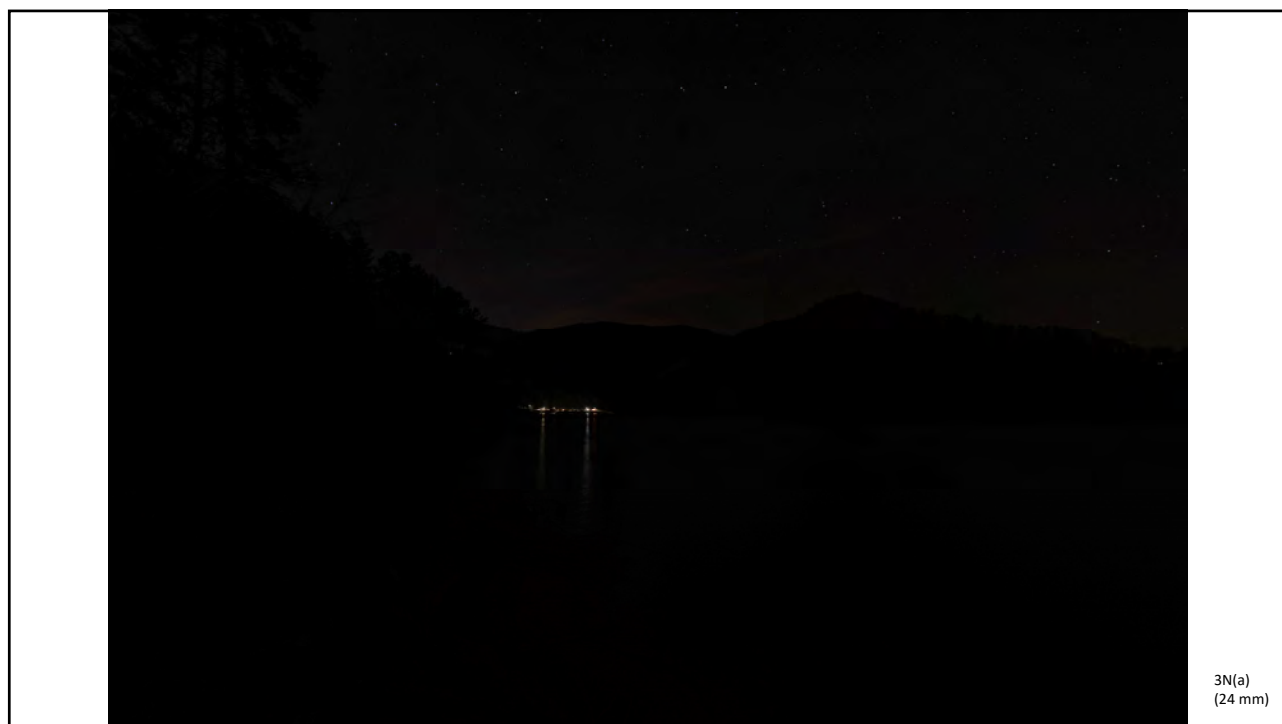
20



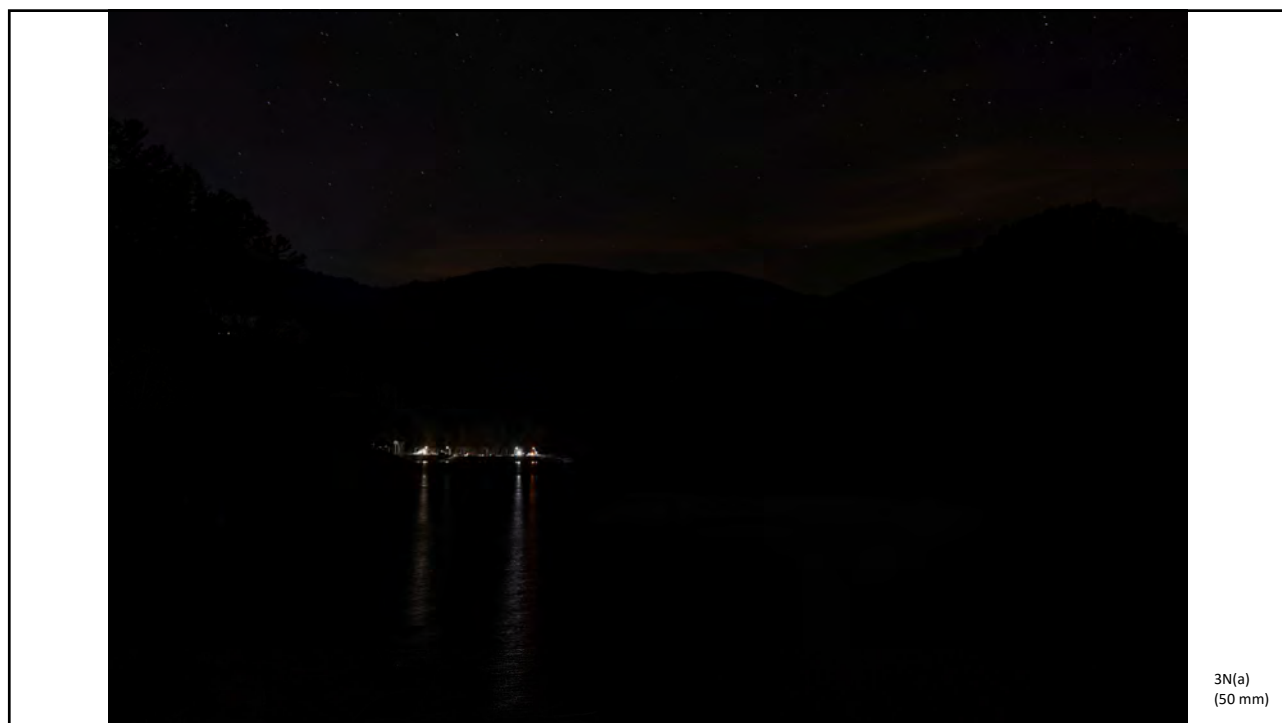
21



22



23



24



25



26

Goal: Select No More than 2!



1N



3N(a) – 24 mm



3N(a) – 50 mm



3N(b) – 24 mm



3N(b) – 50 mm

27

## Visual Resource Study - Next Steps

- Task 5 – Existing Visual Quality Assessment
- Task 6 – Visual Analysis
  - Develop visualizations
- Task 7 – Visual Management Consistency Review
- Task 8 – Mitigation Assessment
- Task 9 – Conceptual Design of Bad Creek II Complex
  - Evaluate Lighting Effects
- Task 10 – Report (2nd quarter, 2024)



Visual Resources Study – January 11, 2024 | 28

28

**From:** [Sue Williams](#)  
**To:** [Crutchfield Jr., John U](#)  
**Cc:** [Amy Breedlove](#); [Andrew Gleason](#); [Andy Douglas](#); [Chris Starker](#); [Dale Wilde](#); [Dan Rankin](#); [Elizabeth Miller](#); [Kelly Kirven](#); [Ken Forrester](#); [quattrol](#); [Salazar, Maggie](#); [Amedee, Morgan D.](#); [Pat Cloninger](#); [SelfR](#); [Rowdy Harris](#); [Stuart, Alan Witten](#); [William T. Wood](#); [Willie Simmons](#); [Huff, Jen](#); [Kulpa, Sarah](#); [McCarney-Castle, Kerry](#)  
**Subject:** Re: Bad Creek Relicensing-Recreation & Visual Resources Committee Meeting Materials (1/11/2024 Meeting)  
**Date:** Tuesday, January 16, 2024 12:16:57 PM

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**CAUTION:** [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

With the exception of a possible typo under the Lighting Evaluation, it all looks good to me. The paragraph Photo 3N(a) has the letter f following the period.

Sue Williams  
Six Mile, SC

On Jan 16, 2024, at 11:41, Crutchfield Jr., John U <[John.Crutchfield@duke-energy.com](mailto:John.Crutchfield@duke-energy.com)> wrote:

Dear Bad Creek Relicensing Recreation & Visual Resources Committee Members:

Please find attached the summary of Visual Resources Study meeting held on January 11, 2024. I have also included below the SharePoint link to access the meeting summary, PowerPoint presentation, and the recorded Teams meeting.

[Bad Creek Relicensing Project – Resource Committees - 2024 01 11 Rec RC Mtg - All Documents \(sharepoint.com\)](#)

For those who attended the meeting, please review the meeting summary, and let me know if you have any comments or edits by Friday, February 2 (COB).

Please let Alan or me know if you have any questions about the meeting materials.

Regards,

***John Crutchfield***

Project Manager II  
Water Strategy, Hydro Licensing & Lake Services  
Regulated & Renewable Energy  
Duke Energy  
525 South Tryon Street, DEP-35B | Charlotte, NC 28202  
Office 980-373-2288 | Cell 919-757-1095

<2024 01 11 rec rc mtg summary.pdf>

**From:** [Crutchfield Jr., John U](#)  
**To:** [Amy Breedlove](#); [Andrew Gleason](#); [Andy Douglas](#); [Chris Starker](#); [Dale Wilde](#); [Dan Rankin](#); [Elizabeth Miller](#); [Kelly Kirven](#); [Ken Forrester](#); [quattrol](#); [Salazar, Maggie](#); [Amedee, Morgan D.](#); [Pat Cloninger](#); [SelfR](#); [Rowdy Harris](#); [Stuart, Alan Witten](#); [suewilliams130@gmail.com](#); [William T. Wood](#); [Willie Simmons](#); [Huff, Jen](#); [Pardue, Ethan](#); [glenn@hilliardgrp.com](#)  
**Cc:** [Kulpa, Sarah](#); [McCarney-Castle, Kerry](#)  
**Subject:** RE: Bad Creek Relicensing-Recreation & Visual Resources Committee Meeting Materials (1/11/2024 Meeting)  
**Date:** Friday, February 9, 2024 6:20:32 AM  
**Importance:** High

---

**CAUTION:** [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Bad Creek Relicensing Recreation & Visual Resources Committee Members:

The summary of Visual Resources Study meeting held on January 11, 2024 has been finalized and can be accessed at the SharePoint link below.

[Bad Creek Relicensing Project – Resource Committees - 2024 01 11 Rec RC Mtg - All Documents \(sharepoint.com\)](#)

Thanks, John Crutchfield

---

**From:** Crutchfield Jr., John U  
**Sent:** Monday, January 29, 2024 6:13 AM  
**To:** Amy Breedlove <[BreedloveA@dnr.sc.gov](mailto:BreedloveA@dnr.sc.gov)>; Andrew Gleason <[andrewandwilla@hotmail.com](mailto:andrewandwilla@hotmail.com)>; Andy Douglas <[adoug41@att.net](mailto:adoug41@att.net)>; Chris Starker <[cstarker@upstateforever.org](mailto:cstarker@upstateforever.org)>; Dale Wilde <[dwilde@keoweefolks.org](mailto:dwilde@keoweefolks.org)>; Dan Rankin <[RankinD@dnr.sc.gov](mailto:RankinD@dnr.sc.gov)>; Elizabeth Miller <[MillerE@dnr.sc.gov](mailto:MillerE@dnr.sc.gov)>; Kelly Kirven <[Kelly.Kirven@KleinschmidtGroup.com](mailto:Kelly.Kirven@KleinschmidtGroup.com)>; Ken Forrester <[forresterk@dnr.sc.gov](mailto:forresterk@dnr.sc.gov)>; Lynn Quattro <[quattrol@dnr.sc.gov](mailto:quattrol@dnr.sc.gov)>; Maggie Salazar <[maggie.salazar@hdrinc.com](mailto:maggie.salazar@hdrinc.com)>; Morgan Amedee <[amedeemd@dhec.sc.gov](mailto:amedeemd@dhec.sc.gov)>; Pat Cloninger <[cloningerp@dnr.sc.gov](mailto:cloningerp@dnr.sc.gov)>; Ross Self <[SelfR@dnr.sc.gov](mailto:SelfR@dnr.sc.gov)>; Rowdy Harris <[charris@scprt.com](mailto:charris@scprt.com)>; Stuart, Alan Witten <[Alan.Stuart@duke-energy.com](mailto:Alan.Stuart@duke-energy.com)>; Sue Williams <[suewilliams130@gmail.com](mailto:suewilliams130@gmail.com)>; William Wood <[woodw@dnr.sc.gov](mailto:woodw@dnr.sc.gov)>; Willie Simmons <[simmonsw@dnr.sc.gov](mailto:simmonsw@dnr.sc.gov)>; Huff, Jen <[Jen.Huff@hdrinc.com](mailto:Jen.Huff@hdrinc.com)>  
**Cc:** Sarah Kulpa <[Sarah.Kulpa@hdrinc.com](mailto:Sarah.Kulpa@hdrinc.com)>; Kerry McCarney-Castle <[Kerry.McCarney-Castle@hdrinc.com](mailto:Kerry.McCarney-Castle@hdrinc.com)>  
**Subject:** RE: Bad Creek Relicensing-Recreation & Visual Resources Committee Meeting Materials (1/11/2024 Meeting)  
**Importance:** High

Dear Bad Creek Relicensing Recreation & Visual Resources Committee Members:

Just a reminder for those who attended the meeting, please provide any comments on the meeting minutes by Friday, February 2 (if you have not commented yet).

Thanks, John

---

**From:** Crutchfield Jr., John U

**Sent:** Tuesday, January 16, 2024 11:41 AM

**To:** Amy Breedlove <[BreedloveA@dnr.sc.gov](mailto:BreedloveA@dnr.sc.gov)>; Andrew Gleason <[andrewandwilla@hotmail.com](mailto:andrewandwilla@hotmail.com)>; Andy Douglas <[adoug41@att.net](mailto:adoug41@att.net)>; Chris Starker <[cstarker@upstateforever.org](mailto:cstarker@upstateforever.org)>; Dale Wilde <[dwilde@keoweefolks.org](mailto:dwilde@keoweefolks.org)>; Dan Rankin <[RankinD@dnr.sc.gov](mailto:RankinD@dnr.sc.gov)>; Elizabeth Miller <[MillerE@dnr.sc.gov](mailto:MillerE@dnr.sc.gov)>; Kelly Kirven <[Kelly.Kirven@KleinschmidtGroup.com](mailto:Kelly.Kirven@KleinschmidtGroup.com)>; Ken Forrester <[forresterk@dnr.sc.gov](mailto:forresterk@dnr.sc.gov)>; Lynn Quattro <[quattrol@dnr.sc.gov](mailto:quattrol@dnr.sc.gov)>; Maggie Salazar <[maggie.salazar@hdrinc.com](mailto:maggie.salazar@hdrinc.com)>; Morgan Amedee <[amedeemd@dhec.sc.gov](mailto:amedeemd@dhec.sc.gov)>; Pat Cloninger <[cloningerp@dnr.sc.gov](mailto:cloningerp@dnr.sc.gov)>; Ross Self <[SelfR@dnr.sc.gov](mailto:SelfR@dnr.sc.gov)>; Rowdy Harris <[charris@scprt.com](mailto:charris@scprt.com)>; Stuart, Alan Witten <[Alan.Stuart@duke-energy.com](mailto:Alan.Stuart@duke-energy.com)>; Sue Williams <[suewilliams130@gmail.com](mailto:suewilliams130@gmail.com)>; William Wood <[woodw@dnr.sc.gov](mailto:woodw@dnr.sc.gov)>; Willie Simmons <[simmonsw@dnr.sc.gov](mailto:simmonsw@dnr.sc.gov)>; Huff, Jen <[Jen.Huff@hdrinc.com](mailto:Jen.Huff@hdrinc.com)>

**Cc:** Sarah Kulpa <[Sarah.Kulpa@hdrinc.com](mailto:Sarah.Kulpa@hdrinc.com)>; Kerry McCarney-Castle <[Kerry.McCarney-Castle@hdrinc.com](mailto:Kerry.McCarney-Castle@hdrinc.com)>

**Subject:** Bad Creek Relicensing-Recreation & Visual Resources Committee Meeting Materials (1/11/2024 Meeting)

**Importance:** High

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Please let Alan or me know if you have any questions about the meeting materials.

Regards,

**John Crutchfield**

Project Manager II

Water Strategy, Hydro Licensing & Lake Services

Regulated & Renewable Energy

Duke Energy

525 South Tryon Street, DEP-35B | Charlotte, NC 28202

Office 980-373-2288 | Cell 919-757-1095

# Meeting Minutes

|            |   |                             |  |
|------------|---|-----------------------------|--|
| Project:   | Bad Creek Relicensing                           |                             |  |
| Subject:   | Visual Resources Meeting for Key View Selection |                             |  |
| Date:      | Thursday, January 11, 2024                      |                             |  |
| Location:  | Microsoft Teams                                 |                             |  |
| Attendees: | Sue Williams – AQD                              | Jen Huff – HDR              |  |
|            | Alan Stuart – Duke Energy                       | Kerry McCarney-Castle – HDR |  |
|            | John Crutchfield – Duke Energy                  | James Lane - HDR            |  |
|            | Andrew Gleason – Foothills Trail Conservancy    |                             |  |
|            | Amy Chastain – SCDNR                            |                             |  |
|            | Chris Starker – Upstate Forever                 |                             |  |

## Introduction

John Crutchfield opened the meeting at 9:00 am and let folks know the meeting would be recorded for those who could not be in attendance as well as for future reference. He asked for objections; no one objected. Duke Energy will make available the meeting summary, PowerPoint presentation, and recording on the SharePoint site in the next couple of weeks.

J. Crutchfield reviewed the agenda and purpose of meeting. As a reminder, six potential Key Observation Points (KOPs) were agreed upon during the Visual Resources meeting in July 2023. The purpose of today's meeting is for the Visual Resources committee to choose four (out of the six originally agreed upon) KOPs based on photos captured during leaf-off conditions in November 2023 (not yet seen by the Recreation & Visual Resources Resource Committee [RC]) and to obtain input and consensus for selection of the nighttime views for photo rendering.

Safety Moment (J. Crutchfield) – Cold Stress

## KOP Selection

Jen Huff provided a refresher on the Seen Area Analysis and potential KOPs from the July 2023 meeting in Greenville, SC. At that meeting, it was decided the KOP3 photo (from Whitewater River cove) would not be re-collected since the photo rendering is already complete for the additional inlet/outlet associated with Bad Creek II. Six potential KOPs were identified during the July Resource Committee meeting. Selected KOPs will be used to complete the remaining Visual Resources Study tasks.

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1. **KOP2:** Lower Whitewater Falls overlook toward Bad Creek, 24mm and 50mm views. Some project facilities were visible but not noticeable. Would likely not be able to see any facilities during leaf-on conditions.
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4. **KOP10a:** View from privately-owned dock at Fisher Knob, 24 mm and 50 mm views. Closest private dock to inlet/outlet structure; inlet/outlet portal visible.
5. **KOP10b:** View from privately-owned residence at Fisher Knob, 24 mm and 50 mm views. Homeowner's yard from point where land juts out into Whitewater River Cove. Inlet/outlet structure visible more clearly.
6. **KOP11:** Entrance to Musterground Road near the Foothills Trail information kiosk (added in-field), 24 mm view. View of open field with warehouse and Duke Energy office building; open field will be future location of new transmission line switchyard.

J. Huff opened the floor to discussion and led meeting participants through the process of choosing four out of the six potential KOPs to retain for the study. Jen said the selection would be through consensus of the RC, i.e., the committee members could live with the selected KOPs.

Sue Williams asked if the transmission line (new) will follow the existing transmission line. J. Huff answered yes, that is correct. S. Williams indicated there may not be much value from the Oscar Wigginton Overlook (KOP7) for transmission line views since it would be the basically the same view.

Chris Starker countered it might be worth keeping the power line views at Oscar Wigginton (KOP7) since the existing transmission corridor is 200 feet wide and will be expanded to nearly

380 feet. Widening the corridor could change the view, even though the transmission lines would follow the existing lines.

C. Starker stated KOP11 (Musterground Road kiosk) may not be useful since it is a parking lot and not an area of recreation, though the new transmission line switchyard at that site may have the effect of making the area feel more industrial and recreators may feel less secure.

J. Huff asked about removing KOPs10a and 10b. C. Starker asked for confirmation if both KOPs are homeowner views and noted the concern is more for the public, not for private property owners (who already experience the view). Amy Chastain stated that KOP10b would be useful to keep from a boating standpoint, as that is the view one sees when entering Whitewater River Cove via boat. Alan Stuart agreed that the 10a and 10b views were from the water views so may be important to keep at least one of them.

A. Chastain also suggested removing KOP11 since it is a parking lot, and a switchyard likely wouldn't deter visitors from hiking.

J. Huff reminded the group photo simulations were already done from the water for KOP3, which was taken from the Whitewater River Cove.

J. Huff asked for RC consensus on keeping photo simulations for KOP2. The RC agreed.

C. Starker noted that with leaf-on conditions, one wouldn't normally see anything as long as there is a healthy canopy (persistent) in place. The photo from Oscar Wiggington Overlook may be important from that standpoint because that canopy would need to be maintained (cut).

Andrew Gleason stated in his opinion, KOP11 (Musterground Parking lot) could be dropped from further evaluation, given the area will be closed off during construction. J. Huff reminded the group that the open field would have a switchyard for the life of the project.

J. Huff noted while they were on-site collecting images, two other cars accessed the Bad Creek Visitors Overlook, therefore, it is regularly used (KOP4). The RC reached consensus on keeping KOP4.

J. Huff returned to KOPs10a and 10b and reminded the group about KOP3. Sue Williams favors 10b to keep. Group consensus to eliminate KOP10a.

**KOP Selection Final Consensus:** Eliminate KOP11 (Musterground Road entrance) and KOP10a (homeowner dock). Retain KOPs 2, 4, 7, 10b, and existing KOP3.

## Lighting Evaluation

Nighttime views were collected December 6, 2023. J. Huff showed map of locations where images were collected and noted changes that were made in the field based on view/field conditions/best professional judgement. Nighttime photography was challenging – collecting nighttime views are difficult because it's necessary to use long photographic exposures. While HDR's photographer (James Lane) is experienced in nighttime photography, some exposures led to lighter views (in photos) than what was experienced in the field.

J. Huff indicated there were two views where neither the Project nor light associated with it were visible at all – the top of Jocassee Dam and Devil's Fork State Park at the remote boat launch area. C. Starker asked about not seeing lights at certain views and that the concern is that additional light would be added from Bad Creek II. J. Huff indicated for photo simulations, Duke Energy would be replicating the current amount of light to represent Bad Creek II (and when there is nothing but darkness, only darkness could be replicated).

**Photo 1N:** View from the entrance to Musterground Road.

**Photo 3N(a):** View from Fisher Knob homeowner site (KOP10a); can see lights of the inlet/outlet structure.f

**Photo 3N(b):** View from Fisher Knob homeowner (3Nb); can see lights from inlet/outlet as well as existing transformer yard on top of the hill.

A. Stuart asked about faint visible light to the north of ridge (north of the Project) above the ridge crest in the 3N(b) photos since there is no city nearby. J. Huff noted that faint light near ridgetops is an artifact of the long photographic exposure.

J. Huff asked if there would be interest / value in seeing a photo simulation of the future switchyard at night from location 1N. C. Starker agreed there would be interest and asked if it would be very illuminated at night. J. Huff said no, the switchyard would have some security lights but would not be brightly lit.

J. Huff noted 3Nb might be the best (at the 24mm) image to use as it shows the view from a boat on Whitewater River Cove. A. Chastain agrees as does S. Williams. C. Starker asked if 3Na and 3Nb are the same view. Jen replied 3N(a) is from the dock closest to the intake/outlet and the other is further out on the point at Fisher Knob. C. Starker asked what nighttime would look like from either of the overlooks. J. Huff indicated photos were not collected from the overlooks because it is assumed that people don't view vistas in the dark.

**Nighttime Lighting Final Consensus:** 1N and 3nb (24mm)

## Next Steps

Tasks 5-10 will be completed, and the Visual Resources Study Report will be distributed for RC review during the second quarter of this year (2024).

C. Starker asked if anybody is aware of astronomy clubs that use these areas. A. Gleason responded he is aware of the Roper Mountain Astronomy Club, but they use Sassafras Mountain which is east of Lake Jocassee. A. Stuart is not aware of any and he had asked the same question. J. Huff is not familiar with folks doing night hikes or visiting the site for star gazing but will look into it. A. Gleason noted he was not aware of any activities at Bad Creek.

J. Huff reiterated the meeting summary, recording, and presentation would be made available via the SharePoint Site. J. Crutchfield thanked everybody for their input and adjourned the meeting at 9:50 am.

# Bad Creek Pumped Storage Project No. 2740

Visual Resources Study -  
Recreation & Visual Resources  
Resource Committee



JANUARY 11, 2024

1

## Meeting Agenda

- Welcome and Meeting Purpose
- Safety Moment
- Introductions
- Visual Resources Study Refresher
  - Task 2: Seen Area Analysis
  - Task 4: Potential Key Views Selection
- Key Views Selection
  - Daytime Key Observation Points
  - Lighting Effects
- Next Steps & Schedule



Visual Resources Study – January 11, 2024 | 2

2

## Safety Moment – Cold Stress

- Know the symptoms of cold stress.
- Monitor your physical condition and that of others.
- Take regular breaks to warm up when needed.
- Dress properly for the cold.
  - At least 3 layers!
  - Tight clothing reduces blood circulation to the extremities.
- Stay dry in the cold. Moisture or dampness, including sweating, can increase the rate of heat loss from the body.
- Keep extra clothing (including underwear) handy in case you get wet and need to change.
- Drink warm sweetened fluids (no alcohol).
- Include chemical hot packs in your first aid kit.
- Avoid touching cold metal or wet surfaces with bare skin.

| Condition   | Symptoms   |  |
|-------------|--|--|
| Hypothermia | <b>Early Symptoms</b>  | <b>Late Symptoms</b>   |
|             | <ul style="list-style-type: none"> <li>• Shivering</li> <li>• Fatigue</li> <li>• Loss of coordination</li> <li>• Confusion, disorientation</li> </ul>            | <ul style="list-style-type: none"> <li>• No shivering</li> <li>• Blue skin</li> <li>• Dilated pupils</li> <li>• Slowed pulse and breathing</li> <li>• Loss of consciousness</li> </ul> |
| Frostbite   | <ul style="list-style-type: none"> <li>• Reduced blood flow to hands, feet</li> <li>• Numbness</li> </ul>  | <ul style="list-style-type: none"> <li>• Aching</li> <li>• Tingling or stinging</li> <li>• Bluish or pale, waxy skin</li> </ul>  |
| Trench Foot | <ul style="list-style-type: none"> <li>• Reddening of the skin</li> <li>• Numbness</li> <li>• Leg cramps</li> <li>• Swelling</li> <li>• Tingling pain</li> </ul> | <ul style="list-style-type: none"> <li>• Blisters, ulcers</li> <li>• Bleeding under the skin</li> <li>• Gangrene (foot may turn dark purple, blue, or gray)</li> </ul>                 |
| Chillblains | <ul style="list-style-type: none"> <li>• Redness</li> <li>• Itching</li> <li>• Possible blistering</li> </ul>  | <ul style="list-style-type: none"> <li>• Inflammation</li> <li>• Possible ulceration in severe cases</li> </ul>  |

Source: <https://www.cdc.gov/niosh/docs/2010-115/pdfs/2010-115.pdf>

Visual Resources Study – January 11, 2024 | 3

3

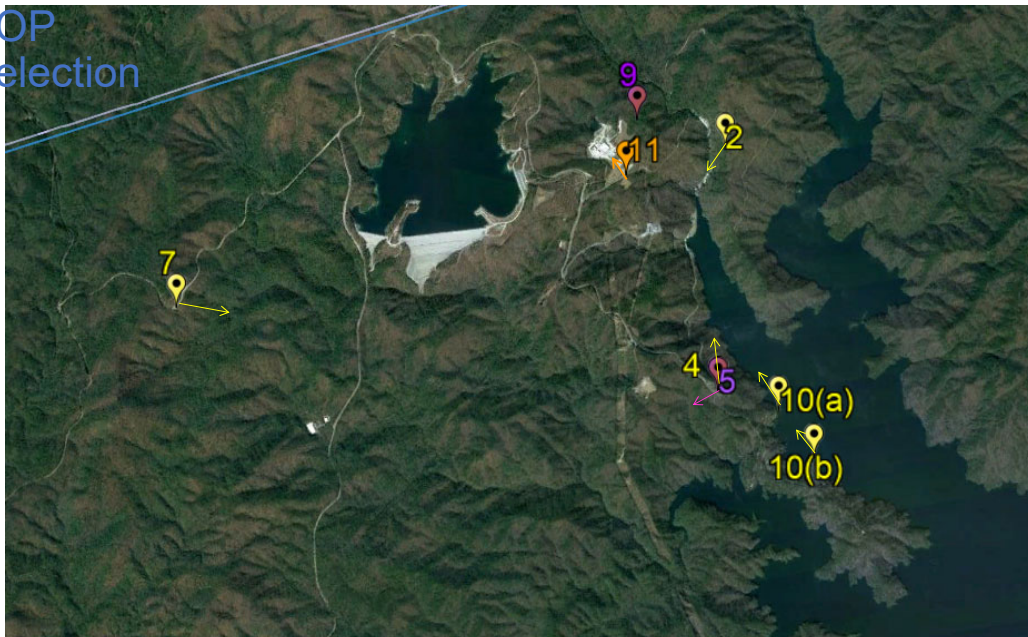
## Visual Resources Study Refresher

- Seen Area Analysis
- Potential Key Observation Points (KOP) selected (July 27, 2023)
  - KOP 3 decision
  - Task 5: Existing landscape quality and characteristics (near foreground, foreground, midground, background)
  - Task 6: Proposed landscape described based on the photosimulation
  - Task 7: Consistency of proposed features with management goals and plans
  - Task 8: Mitigation recommendations to address significant differences between existing & proposed conditions
- Lighting Evaluation Photo Points (October 11, 2023)



4

## Task 4: KOP Selection



- Daytime  
Potential Key  
Views
- Image collected
  - Eliminated by field crew
  - Added by field crew

5

## Task 3: Fieldwork

- December 6, 2023
- Leaf-off conditions
- 24mm and 50 mm
- Daytime
  - 10:00 am – 1:30 pm
  - Sunny with scattered clouds, windy
- Evening
  - 6:00 pm – 9:30 pm
  - Clear, calm, moonrise after midnight



Visual Resources Study – January 11, 2024 | 6

6



7



8



9



10



11



12



13



14



15



16



17



18

Goal: Select No More than 4!



2



4



7



10a



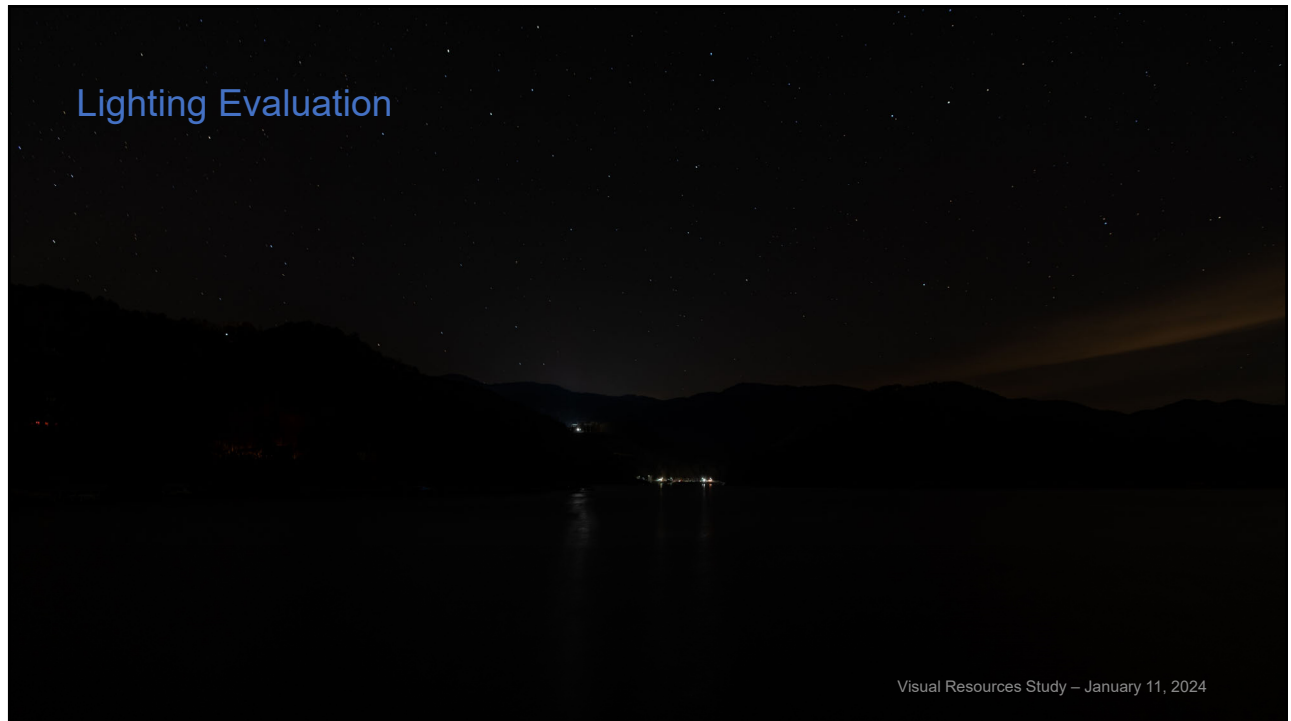
10b



11

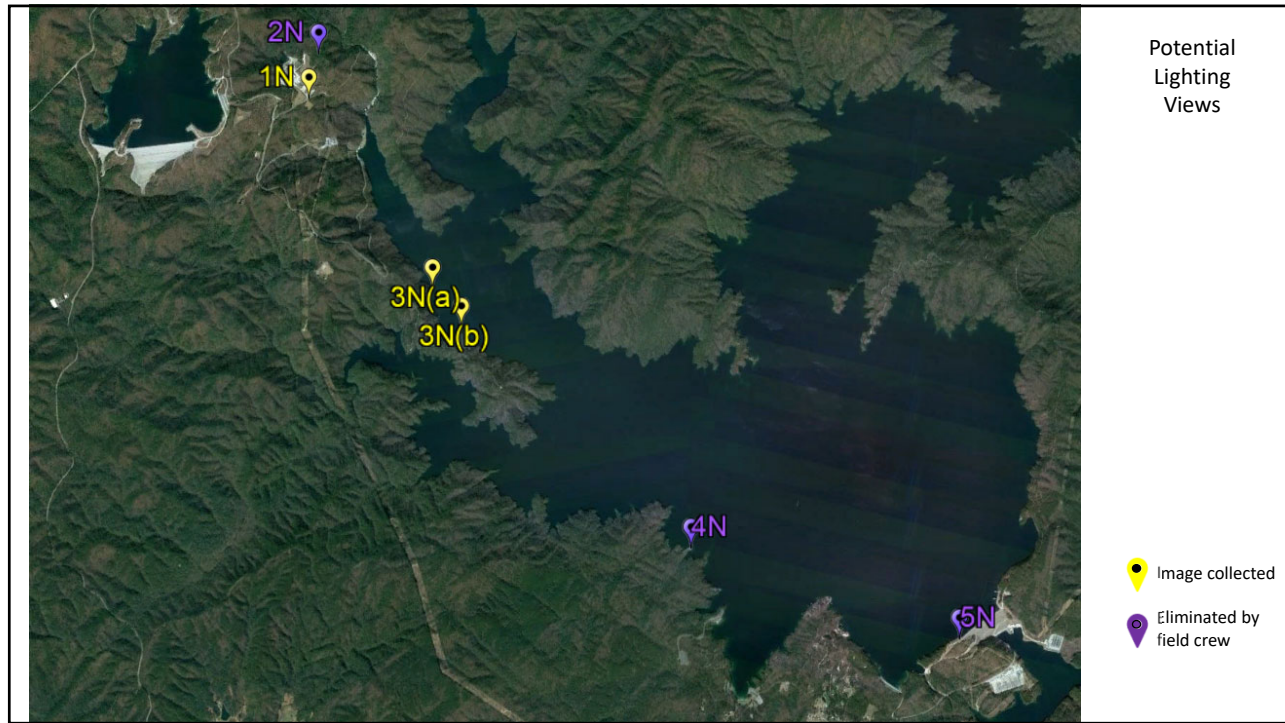
19

## Lighting Evaluation



Visual Resources Study – January 11, 2024

20



21



22



23



24



3N(b)  
(24 mm)

25



3N(b)  
(50 mm)

26

## Goal: Select No More than 2!



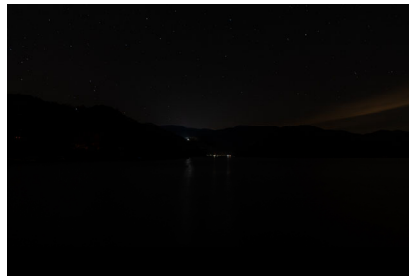
1N



3N(a) – 24 mm



3N(a) – 50 mm



3N(b) – 24 mm

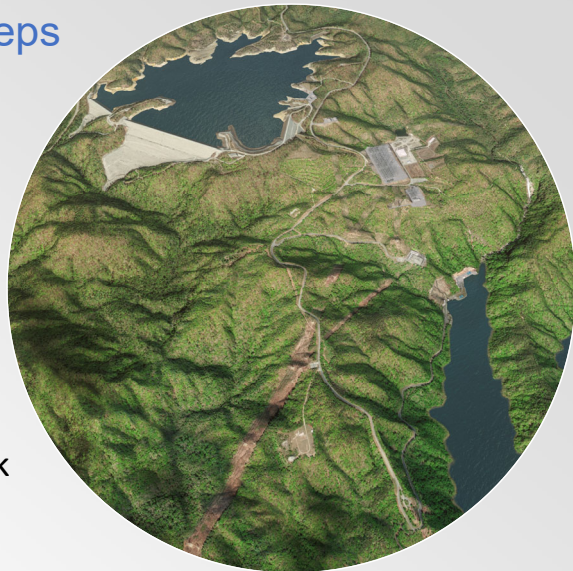


3N(b) – 50 mm

27

## Visual Resource Study - Next Steps

- Task 5 – Existing Visual Quality Assessment
- Task 6 – Visual Analysis
  - Develop visualizations
- Task 7 – Visual Management Consistency Review
- Task 8 – Mitigation Assessment
- Task 9 – Conceptual Design of Bad Creek II Complex
  - Evaluate Lighting Effects
- Task 10 – Report (2nd quarter, 2024)



Visual Resources Study – January 11, 2024 | 28

28

**From:** [Crutchfield Jr., John U](#)  
**To:** [Amy Breedlove](#); [Andrew Gleason](#); [Andy Douglas](#); [Chris Starker](#); [Dale Wilde](#); [Dan Rankin](#); [Elizabeth Miller](#); [glenn@hilliardgrp.com](#); [Kelly Kirven](#); [Ken Forrester](#); [quattrol](#); [Salazar, Maggie](#); [Amedee, Morgan D.](#); [Pat Cloninger](#); [SelfR](#); [Charles \(Rowdy\) B Harris](#); [Stuart, Alan Witten](#); [suewilliams130@gmail.com](#); [William T. Wood](#); [Willie Simmons](#); [Huff, Jen](#); [Pardue, Ethan](#); [Churchill, Christy](#); [PShirley](#); [Bill Ranson-Retired](#); [phil.mitchell@gmail.com](#)  
**Cc:** [Kulpa, Sarah](#); [McCarney-Castle, Kerry](#); [Huff, Jen](#)  
**Subject:** RE: Bad Creek Relicensing Recreation & Visual Resources Committee - Visual Resources Study DRAFT Report (READY for REVIEW)  
**Date:** Wednesday, May 22, 2024 10:07:15 AM  
**Attachments:** [image001.png](#)  
[image002.png](#)  
**Importance:** High

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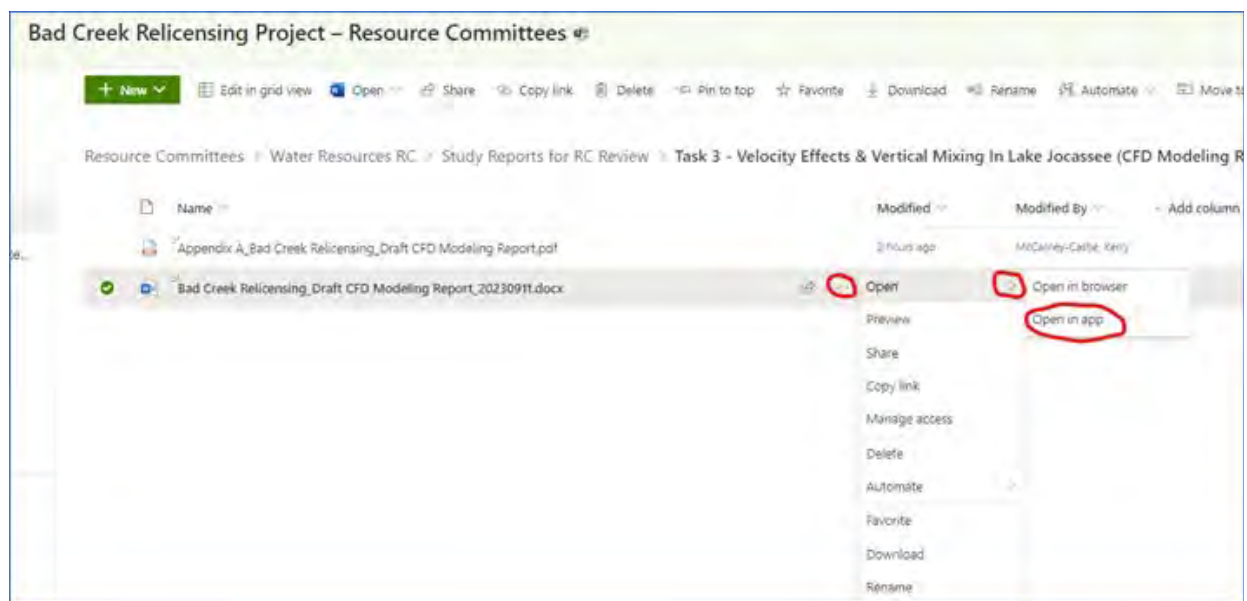
Dear Bad Creek Relicensing Recreation and Visual Resources Committee:

Duke Energy is pleased to distribute the **Visual Resources Study Draft Report** for Resource Committee review. The deliverable is available on the Bad Creek Relicensing SharePoint site at the following link: [Visual Resources](#). Duke Energy is requesting a 30-day review period, therefore, please submit all comments by **June 21**. A confirmation email is kindly requested upon review completion (email me at [John.Crutchfield@duke-energy.com](mailto:John.Crutchfield@duke-energy.com)).

**Important – Please Read!**

- As discussed in the kick-off meeting (July 2022), Duke Energy would like to make relicensing deliverables available on a shared platform (i.e., SharePoint) so all stakeholders can access, review, and comment; therefore, we request all comments be made in the SharePoint Word document using tracked changes. This will eliminate version control issues and result in a consolidated document for comment response.
- We strongly recommend opening the document in Word; otherwise, the formatting will look distorted. The simplest way to do this is to **click on the three dots** to the right of the document (example shown below), **choose “Open”**, then choose **“Open in app”**. This will open the document in Word, and you’ll have the functionality you are accustomed to. Your changes will be saved automatically as you review. Please feel free to reach out to [@McCarney-Castle, Kerry](#) for SharePoint assistance.

(Note: If you are new to SharePoint, a very brief tutorial with screenshots is available on the home page of the Resource Committees tab called [“Editing a Document in SharePoint”](#). This is the same tutorial that was presented during the kick-off meeting. *[The tutorial provides an alternative way to open the document in Word – either technique works!]*)



If you have any questions, please contact Alan Stuart or me.

Regards,

**John Crutchfield**

Project Manager II

Water Strategy, Hydro Licensing & Lake Services

Regulated & Renewable Energy

Duke Energy

525 South Tryon Street, DEP-35B | Charlotte, NC 28202

Office 980-373-2288 | Cell 919-757-1095

**From:** [Crutchfield Jr., John U](#)  
**To:** [McCarney-Castle, Kerry](#)  
**Subject:** FW: [EXTERNAL] Re: Bad Creek Relicensing Recreation & Visual Resources Committee - Visual Resources Study DRAFT Report (READY for REVIEW)  
**Date:** Wednesday, May 22, 2024 5:42:58 PM  
**Attachments:** [image001.png](#)  
[image002.png](#)

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---

**From:** Charles (Rowdy) B Harris <[charris@scprt.com](mailto:charris@scprt.com)>  
**Sent:** Wednesday, May 22, 2024 4:34 PM  
**To:** Crutchfield Jr., John U <[John.Crutchfield@duke-energy.com](mailto:John.Crutchfield@duke-energy.com)>  
**Subject:** [EXTERNAL] Re: Bad Creek Relicensing Recreation & Visual Resources Committee - Visual Resources Study DRAFT Report (READY for REVIEW)

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SCPRT has not comments.

Rowdy Harris  
Park Manager  
Devils Fork State Park  
SC Department of Parks, Recreation & Tourism  
161 Holcombe Circle  
Salem, SC 29676  
Office: (864) 944-2639  
[SCPRT.com](http://SCPRT.com)  
[SouthCarolinaParks.com](http://SouthCarolinaParks.com)

---



---

**From:** Crutchfield Jr., John U <[John.Crutchfield@duke-energy.com](mailto:John.Crutchfield@duke-energy.com)>  
**Sent:** Wednesday, May 22, 2024 10:06 AM  
**To:** Amy Breedlove <[BreedloveA@dnr.sc.gov](mailto:BreedloveA@dnr.sc.gov)>; Andrew Gleason <[andrewandwillia@hotmail.com](mailto:andrewandwillia@hotmail.com)>; Andy Douglas <[adoug41@att.net](mailto:adoug41@att.net)>; Chris Starker <[cstarker@upstateforever.org](mailto:cstarker@upstateforever.org)>; Dale Wilde <[dwilde@keoweefolks.org](mailto:dwilde@keoweefolks.org)>; Dan Rankin <[RankinD@dnr.sc.gov](mailto:RankinD@dnr.sc.gov)>; Elizabeth Miller <[MillerE@dnr.sc.gov](mailto:MillerE@dnr.sc.gov)>; Glenn Hilliard <[glenn@hilliardgrp.com](mailto:glenn@hilliardgrp.com)>; Kelly Kirven <[Kelly.Kirven@KleinschmidtGroup.com](mailto:Kelly.Kirven@KleinschmidtGroup.com)>; Ken Forrester <[forresterk@dnr.sc.gov](mailto:forresterk@dnr.sc.gov)>; Lynn Quattro <[quattrol@dnr.sc.gov](mailto:quattrol@dnr.sc.gov)>; Maggie Salazar <[maggie.salazar@hdrinc.com](mailto:maggie.salazar@hdrinc.com)>; Morgan Amedee

<amedeemd@dhec.sc.gov>; Pat Cloninger <cloningerp@dnr.sc.gov>; Ross Self <SelfR@dnr.sc.gov>; Charles (Rowdy) B Harris <charris@scprt.com>; Stuart, Alan Witten <Alan.Stuart@duke-energy.com>; Sue Williams <suewilliams130@gmail.com>; William Wood <woodw@dnr.sc.gov>; Willie Simmons <simmonsw@dnr.sc.gov>; Huff, Jen <Jen.Huff@hdrinc.com>; Pardue, Ethan <Ethan.Pardue@duke-energy.com>; Churchill, Christy <Christy.Churchill@duke-energy.com>; PShirley@oconeeco.com <PShirley@oconeeco.com>; Bill Ranson <bill.ranson@retiree.furman.edu>; phil.mitchell@gmail.com <phil.mitchell@gmail.com>

**Cc:** Kulpa, Sarah -hdrinc <Sarah.Kulpa@hdrinc.com>; Kerry McCarney-Castle <Kerry.McCarney-Castle@hdrinc.com>; Jen Huff <jen.huff@hdrinc.com>

**Subject:** RE: Bad Creek Relicensing Recreation & Visual Resources Committee - Visual Resources Study DRAFT Report (READY for REVIEW)

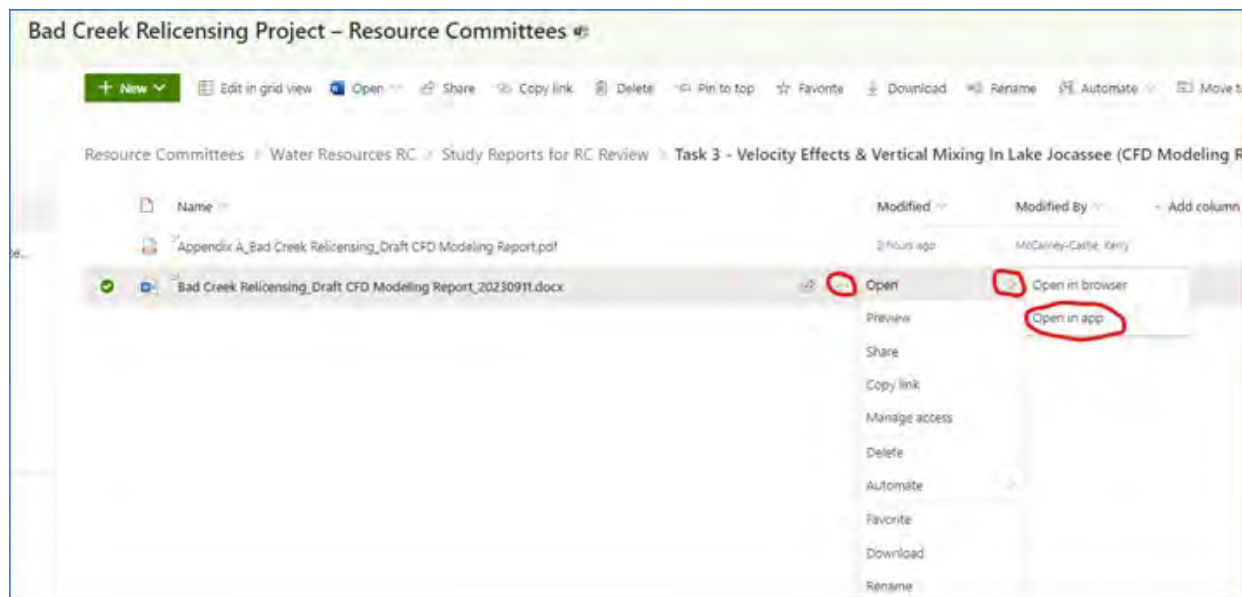
Dear Bad Creek Relicensing Recreation and Visual Resources Committee:

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If you have any questions, please contact Alan Stuart or me.

Regards,

***John Crutchfield***

Project Manager II

Water Strategy, Hydro Licensing & Lake Services

Regulated & Renewable Energy

Duke Energy

525 South Tryon Street, DEP-35B | Charlotte, NC 28202

Office 980-373-2288 | Cell 919-757-1095

**From:** [Crutchfield Jr., John U](#)  
**To:** [McCarney-Castle, Kerry](#)  
**Subject:** FW: [EXTERNAL] Re: Bad Creek Relicensing Recreation & Visual Resources Committee - Visual Resources Study DRAFT Report (READY for REVIEW)  
**Date:** Friday, May 24, 2024 6:13:00 AM

---

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---

**From:** Sue Williams <suewilliams130@gmail.com>  
**Sent:** Thursday, May 23, 2024 5:16 PM  
**To:** Crutchfield Jr., John U <John.Crutchfield@duke-energy.com>  
**Subject:** [EXTERNAL] Re: Bad Creek Relicensing Recreation & Visual Resources Committee - Visual Resources Study DRAFT Report (READY for REVIEW)

**\*\*\* CAUTION! EXTERNAL SENDER \*\*\* STOP. ASSESS. VERIFY!!** Were you expecting this email? Are grammar and spelling correct? Does the content make sense? Can you verify the sender? If suspicious report it, then do not click links, open attachments or enter your ID or password.

John,

I have reviewed this report. I don't have any comments regarding it.

Sue Williams  
Six Mile, SC

On May 22, 2024, at 10:07, Crutchfield Jr., John U <[John.Crutchfield@duke-energy.com](mailto:John.Crutchfield@duke-energy.com)> wrote:

Dear Bad Creek Relicensing Recreation and Visual Resources Committee:

Duke Energy is pleased to distribute the **Visual Resources Study Draft Report** for Resource Committee review. The deliverable is available on the Bad Creek Relicensing SharePoint site at the following link:

[<image001.png>](#)

[Visual Resources](#). Duke Energy is requesting a 30-day review period, therefore, please submit all comments by **June 21**. A confirmation email is kindly requested upon review completion (email me at [John.Crutchfield@duke-energy.com](mailto:John.Crutchfield@duke-energy.com)).

**Important – Please Read!**

1. As discussed in the kick-off meeting (July 2022), Duke Energy would like to make relicensing deliverables available on a shared platform (i.e., SharePoint) so all stakeholders can access, review, and comment; therefore, we request all comments be made in the SharePoint Word document using tracked changes. This will eliminate version control issues and result in a consolidated document for comment response.
2. We strongly recommend opening the document in Word; otherwise, the formatting will look distorted. The simplest way to do this is to **click on the three dots** to the right of the document (example shown below), **choose “Open”**, then choose **“Open in app”**. This will open the document in Word, and you’ll have the functionality you are accustomed to. Your changes will be saved automatically as you review. Please feel free to reach out to [@McCarney-Castle, Kerry](#) for SharePoint assistance.

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<image002.png>

If you have any questions, please contact Alan Stuart or me.

Regards,

**John Crutchfield**

Project Manager II

Water Strategy, Hydro Licensing & Lake Services

Regulated & Renewable Energy

Duke Energy

525 South Tryon Street, DEP-35B | Charlotte, NC 28202

Office 980-373-2288 | Cell 919-757-1095

*This page intentionally left blank.*

A decorative graphic on the left side of the page consists of four overlapping rectangles: a large red one in the upper left, a smaller grey one to its right, a larger grey one below the red one, and a black one at the bottom right.

# Appendix B

Appendix B - Potential Key  
Views Photo Log

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## Potential Key View 2

Conditions: Sunny with scattered clouds. Humidity: 46%; winds: 10 mph with gusts of 22 mph.<sup>1</sup>

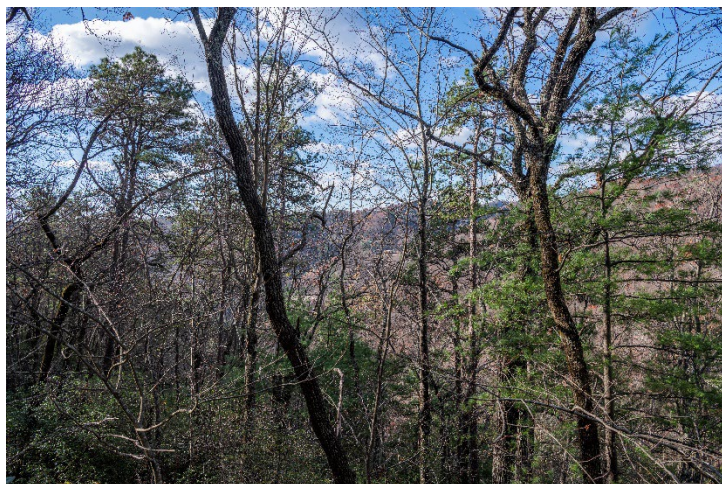
Location: 35.013786, -82.989953

Time: 10:00 am

Photo heading: 216°

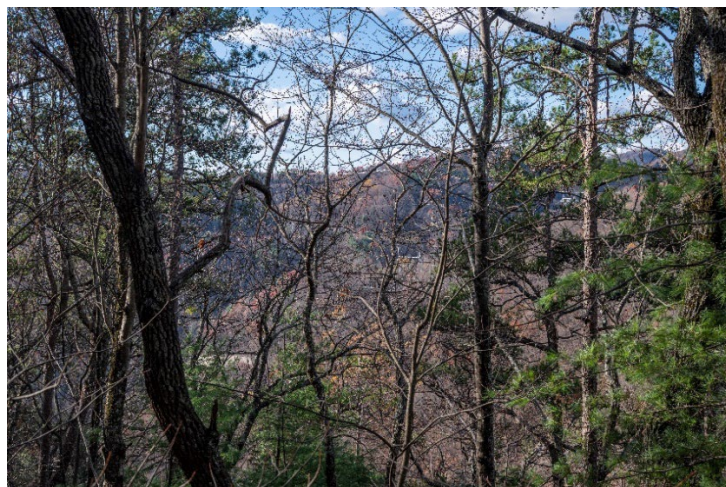
Field Crew: James Lane (HDR), Jen Huff (HDR), Tristan Cleveland (Kimley-Horn)

24 mm



|                   |            |         |        |          |
|-------------------|------------|---------|--------|----------|
| Size Info         |            |         |        |          |
| 8256 x 5504       | 28.2 MB    | 300 dpi | 24 bit |          |
| Device Info       |            |         |        |          |
| NIKON CORPORATION | NIKON D850 | 24 mm   |        |          |
| f/10              | 1/125 sec  | ISO 100 | EXP 0  | No flash |

50 mm



|                   |            |         |        |          |
|-------------------|------------|---------|--------|----------|
| Size Info         |            |         |        |          |
| 8256 x 5504       | 24.5 MB    | 300 dpi | 24 bit |          |
| Device Info       |            |         |        |          |
| NIKON CORPORATION | NIKON D850 | 50 mm   |        |          |
| f/10              | 1/125 sec  | ISO 100 | EXP 0  | No flash |

<sup>1</sup> Humidity and windspeed were obtained from Lake Jocassee Station [Greer, SC undefined | Weather Underground \(wunderground.com\)](#). Accessed on February 7, 2024.

### Potential Key View 4

Conditions: Sunny with scattered clouds. Humidity: 38%. Winds: 14 mph with gusts of 24 mph.

Location: 34.994431, 82.990653

Time: 11:45 am

Photo heading: 351°

Field Crew: James Lane (HDR), Jen Huff (HDR), Tristan Cleveland (Kimley-Horn)

24 mm



|                                       |
|---------------------------------------|
| Size Info                             |
| 8256 x 5504 25.2 MB 300 dpi 24 bit    |
| Device Info                           |
| NIKON CORPORATION NIKON D850 24 mm    |
| f/10 1/250 sec ISO 100 EXP 0 No flash |

50 mm



|                                       |
|---------------------------------------|
| Size Info                             |
| 8256 x 5504 21.5 MB 300 dpi 24 bit    |
| Device Info                           |
| NIKON CORPORATION NIKON D850 50 mm    |
| f/10 1/250 sec ISO 100 EXP 0 No flash |

### Potential Key View 7

Conditions: Sunny with scattered clouds. Humidity: 36%; winds: 13 mph with gusts of 24 mph.

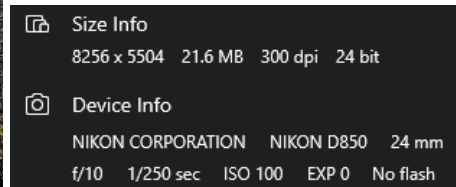
Time: 1:15 pm

Location: 35.001059, -83.043739

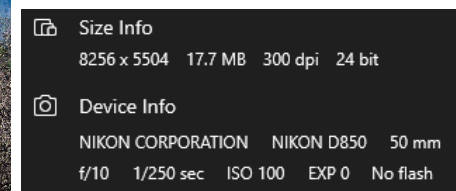
Photo heading: 119°

Field Crew: James Lane (HDR), Jen Huff (HDR), Tristan Cleveland (Kimley-Horn)

24 mm



50 mm



### Potential Key View 10a

Conditions: Sunny with scattered clouds. Humidity: 38%; winds: 14 mph with gusts of 24 mph.

Location: 34.992872, -82.984822

Time: 12:09 pm

Photo heading: 341°

Field Crew: James Lane (HDR), Jen Huff (HDR), Tristan Cleveland (Kimley-Horn)

24 mm



|                                       |
|---------------------------------------|
| Size Info                             |
| 8256 x 5504 19 MB 300 dpi 24 bit      |
| Device Info                           |
| NIKON CORPORATION NIKON D850 24 mm    |
| f/10 1/200 sec ISO 100 EXP 0 No flash |

50 mm



|                                       |
|---------------------------------------|
| Size Info                             |
| 8256 x 5504 18.4 MB 300 dpi 24 bit    |
| Device Info                           |
| NIKON CORPORATION NIKON D850 50 mm    |
| f/10 1/200 sec ISO 100 EXP 0 No flash |

### Potential Key View 10b

Conditions: Sunny with scattered clouds. Humidity: 36%; winds: 13 mph with gusts of 24 mph.

Location: 34.989064, -82.981367

Time: 12:40 pm

Photo heading: 328°

Field Crew: James Lane (HDR), Jen Huff (HDR), Tristan Cleveland (Kimley-Horn)

24 mm



|                                       |
|---------------------------------------|
| Size Info                             |
| 8256 x 5504 16.5 MB 300 dpi 24 bit    |
| Device Info                           |
| NIKON CORPORATION NIKON D850 24 mm    |
| f/10 1/250 sec ISO 100 EXP 0 No flash |

50 mm



|                                       |
|---------------------------------------|
| Size Info                             |
| 8256 x 5504 17 MB 300 dpi 24 bit      |
| Device Info                           |
| NIKON CORPORATION NIKON D850 50 mm    |
| f/10 1/250 sec ISO 100 EXP 0 No flash |

### Potential Key View 11

Conditions: Sunny with scattered clouds. Humidity: 39%; winds: 12 mph with gusts of 28 mph.

Location: 35.011594, -82.999658

Time: 11:15 am

Photo heading: 302°

Field Crew: James Lane (HDR), Jen Huff (HDR), Tristan Cleveland (Kimley-Horn)



### Potential Night View 1N

Conditions: Clear. Humidity: 55%. Winds: 6 mph and steady.

Location: 35.011594, -82.999658

Time: 6:30 pm

Photo heading: 302°

Field Crew: James Lane (HDR), Jen Huff (HDR)



See discussion in 6.3 regarding development of this image.

### Potential Night View 3Na

Conditions: Clear. Humidity: 55%; winds: 6 mph and steady.

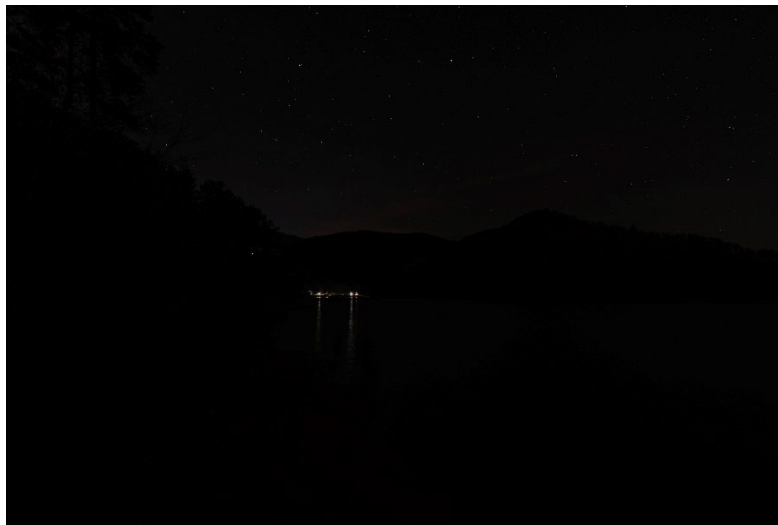
Location: 34.992872, -82.984822


Time: 7:04 pm


Photo heading: 341°

Field Crew: James Lane (HDR), Jen Huff (HDR)

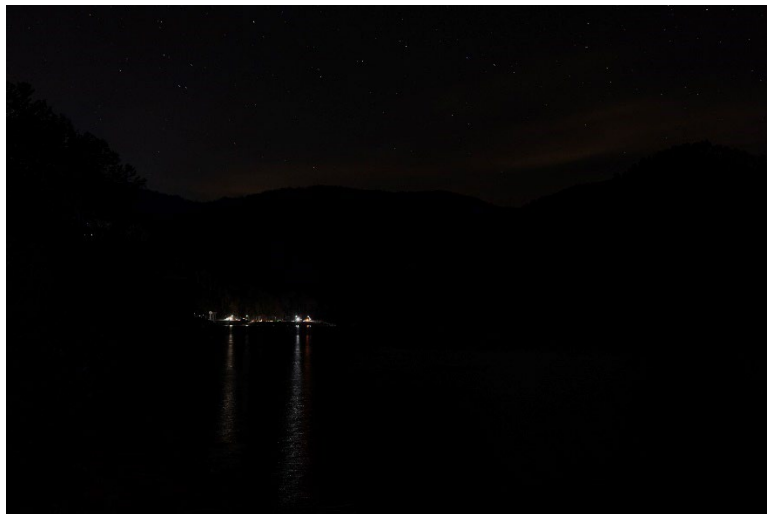
24 mm





 Size Info  
8256 x 5504 2.9 MB 300 dpi 24 bit

 Device Info  
NIKON CORPORATION NIKON D850 24 mm  
f/4 30 sec ISO 400 EXP 0 No flash

50 mm



 Size Info  
8256 x 5504 2.9 MB 300 dpi 24 bit

 Device Info  
NIKON CORPORATION NIKON D850 50 mm  
f/4 30 sec ISO 400 EXP 0 No flash

### Potential Night View 3Nb

Conditions: Clear. Humidity: 55%; winds: 6 mph and steady.

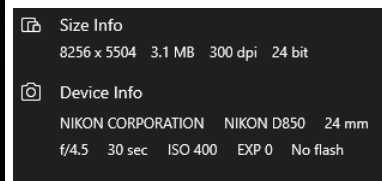
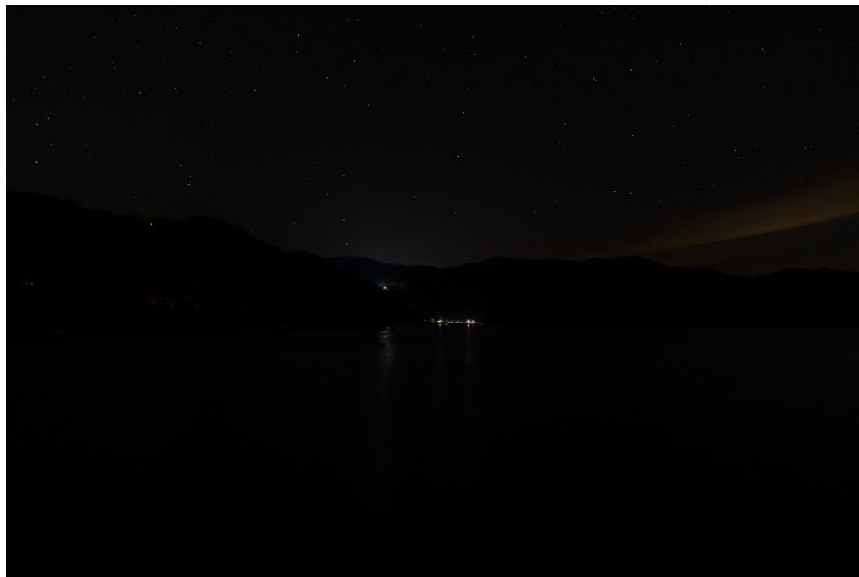
Location: 34.989064, -82.981367

Time: 7:29 pm

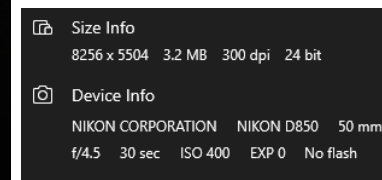
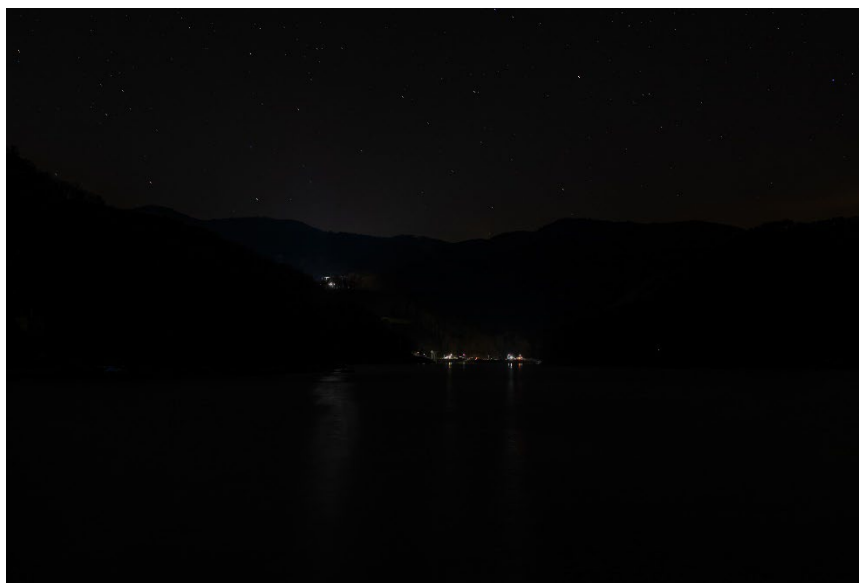
Photo heading: 328°

Field Crew: James Lane (HDR), Jen Huff (HDR)

24 mm



50 mm



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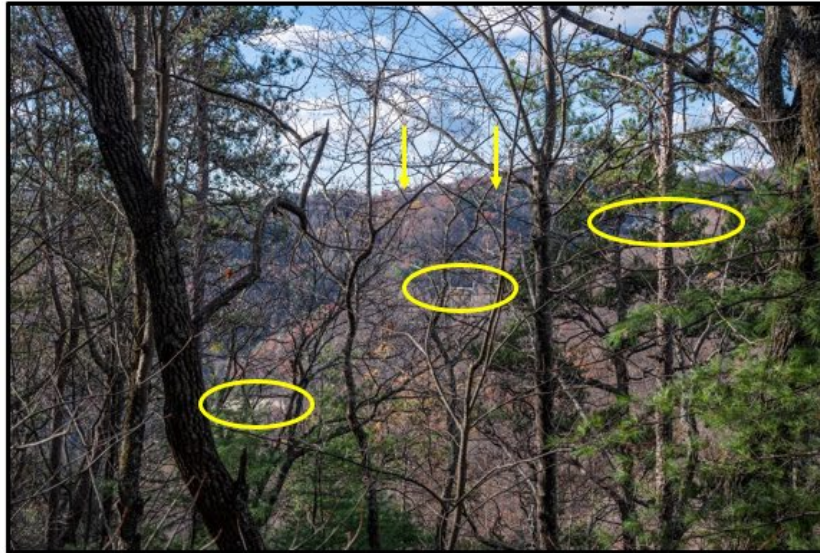
A decorative graphic on the left side of the page consists of four overlapping rectangles: a large red one in the middle, a grey one above it, a grey one below it, and a black one to the right of the bottom grey one.

# Appendix C

Appendix C - Annotated  
Visualizations

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## Key View 2: Lower Whitewater Falls Observation Platform



Existing



Proposed

- 1. Transmission lines
- 2. Lower inlet/outlet bank

## Key View 3: Lower Inlet/Outlet Portal from Whitewater Cove



Existing



Proposed

## Key View 4: Bad Creek Visitor Overlook



Existing



Proposed

1. Inlet/outlet portal
2. Inlet/outlet cove

## Key View 7: Oscar Wigington Scenic Overlook



Existing



Proposed

## Key View 10b: Fisher Knob Point



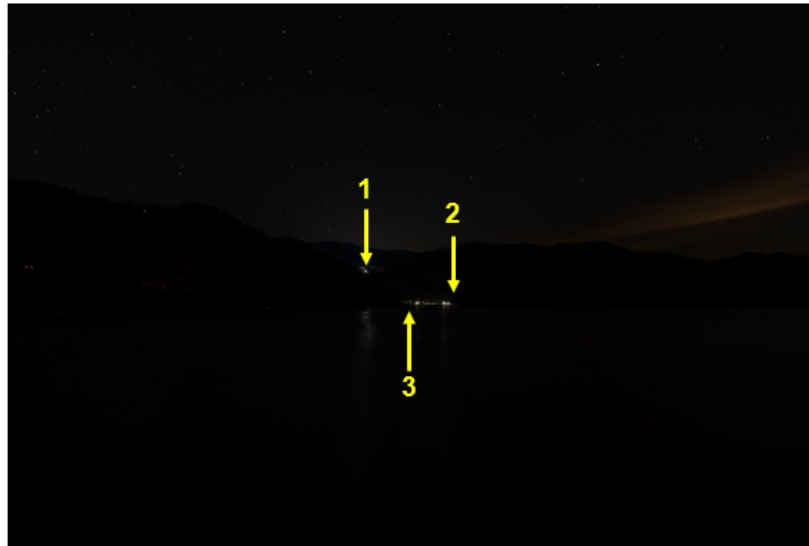
Existing



Proposed

1. Transmission lines
2. Lower inlet/outlet portal

## Night View 3N: Fisher Knob Point



Existing

1. Transformer yard
2. Wastewater treatment, parking
3. Lower inlet/outlet



Proposed

1. Lower inlet/outlet portal

## Proposed Site Layout

1. Spoil areas
2. Upper inlet/outlet structure
3. Transformer yard, switchyard, access road
4. Interconnect line
5. Lower inlet/outlet
6. Primary transmission line
7. Temporary access road

